General Catalogue

UK Product Supplement

Controls and Instrumentation Solutions

MURPHY
reliable innovation

MURPHY®
reliable innovation

All around the world people depend on Murphy. Our quality controls, instrumentation and protection equipment are at work ensuring reliable operation in a wide range of engine-driven applications:-

- power generation
- irrigation, industrial and fire pumping
- oil and gas production
- off-road equipment
- marine propulsion.

Our product range includes:-

- Pressure and temperature gauges and Swichgages®, for monitoring and fault protection
- Fluid level maintainers and Swichgages®
- Tachometers and speed switches
- Shock and vibration switches
- Engine and generator control modules
- Engine control and protection panels
- Valves, solenoids and rack-pullers
- J1939 CANBUS controls and instrumentation

This catalogue lists supplementary and special products produced or supplied by Murphy UK. For details of our standard product range, produced at Murphy facilities in the UK, USA and Mexico, please refer to our General or Condensed Catalogues.

The latest information on the full range of Murphy products is also available at **www.fwmurphy.co.uk/products**. Updates to product literature are listed at **www.fwmurphy.co.uk/LRN**.
To discuss your requirements or request a quotation, please contact our engineers:-

Frank W. Murphy Ltd.
Swichgage House
Church Road
Laverstock
Salisbury
SP1 1QZ
United Kingdom

tel: **+44 (0)1722 410055**
fax: **+44 (0)1722 410088**
email: **sales@fwmurphy.co.uk**

FRANK W. MURPHY LTD.
Swichgage House, Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 1722 410055 email: sales@fwmurphy.co.uk
fax: +44 1722 410088 web: www.fwmurphy.co.uk

General catalogue – UK product supplement

Contents

Further information and installation instructions for the full range of Murphy controls is available online at **www.fwmurphy.co.uk/products**

76.PS Pressure Switch

ys6337
revision C, 9th April 2003
catalogue section 05

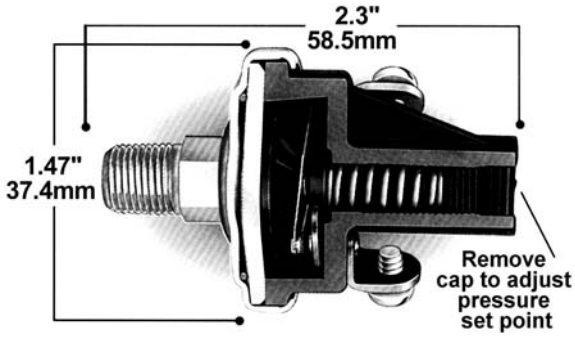
- **Rugged, compact design**
- **Extended duty applications**
- **Field adjustable**
- **Wide operating pressure and temperature ranges**

Description

A compact and economical pressure switch for extended duty applications. The switch is primarily designed for direct engine mounting, to provide electrical signalling of a low oil pressure fault.

The isolated switch contacts are factory set to close below 15 psi (1 bar), but may be adjusted between 14 and 24 psi (1.0 and 1.6 bar). The polyimide Kapton diaphragm is compatible with air, engine oil and other hydrocarbon media (contact with water-based fluids is not recommended).

Dimensions



How to order

Stock code	*Description*
76.PS.0015	1/8" NPT, 15 psi setting, SPNC contacts
76.PS.0001	1/8" NPT, 15 psi setting, SPDT contacts
76.PS.0001-xxx	Special setting versions of above, where xxx = required set point pressure

Special variations on pressure range and contacts are available for volume orders. Please contact our sales office for details.

Product specification

Construction:-	
base	plated steel
cover	glass reinforced polyester
diaphragm	polyimide film
Pressure ratings:	
factory setting	15 psi / 1 bar
set point adjustment range	14–24 (±3) psi / 1.0–1.6 (±0.2) bar
set point adjustment	7/32" Allen key, 1 turn = 5 psi / 0.3 bar clockwise to increase
max. operating pressure	150 psi / 10 bar
proof pressure	500 psi / 34 bar
burst pressure	750 psi / 51 bar
Contacts:	
type:	optional SPNC or SPDT direct action blade contacts (NC contact closes on low pressure),
ratings (resistive DC)	silver alloy, gold plated. 15 Amp @ 6 VDC 8 Amp @ 12 VDC
ratings (inductive AC)	4 Amp @ 24 VDC 1 Amp @ 120 VAC 0.5 Amp @ 240 VAC
Physical:	
pressure connector	1/8" - 27 NPT male thread
electrical terminals	#8-32 screws
operating temperature	–40 to +121°C / –40 to 250°F
dimensions	see diagram left
weight	approx 65g

Warranty

A one year limited warranty on materials and workmanship is given with this product. Details are available on request and at **www.fwmurphy.co.uk/waranty**.

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

OPLC DPCO
Irrigation Pump Pressure Control

ys6345
revision A, 4th May 2004
catalogue section 05

- **Automatic control of diesel pump demand pressure**
- **Specifically designed for engines driving multiple irrigators**
- **Reduces capital and running costs**

Description

The OPLC DPCO (shown above right) is a variant of the OPL series 4.5 inch/114mm pressure Swichgage®. The gauge face includes adjustable high and low pressure limit contacts: the visible contacts have a self-wiping action for positive electrical switching. The DPCO model includes a dual-pole front facia switch that allows manual selection of START (idle) or RUN (active) throttle control modes.

The OPLC DPCO uses a cast aluminium, weatherproof case, with a hinged front for inspection and wiring connection. Pressure hose connection is via a ¼" NPT fitting in the base.

Application

The OPLC DPCO is typically used with a Murphy AT-03069 throttle controller (shown above left) to maintain pressure in an irrigation pump system. The AT-03069 has is a heavy duty throttle controller with high torque, solid state switching and an electronic clutch, making it ideal for many automatic and semi-automatic engine systems: for full details see document AT-04052B.

The AT-03069 receives high or low pressure signals from the OPLC-DPCO (see overleaf for typical electrical connection), and throttles the engine in response. The combined system has been designed to maintain near constant pressure, even when the engine is driving multiple irrigation systems.

Murphy also recommend the connection of a Murphy PD8183 pulsation dampener in the pressure line to eliminates pointer flutter.

Product specification

Case:	
material	die-cast aluminium
paint finish	polyurethane, red
sealing	weatherproof, NEMA 3R
process connection	¼" NPT
Movement:	
dial	4.5 in. (114mm)
scales	white text on black background 0 - 20 Bar 0 - 200 PSI / 14 bar 0 - 300 PSI / 20 bar
sensing element	Bourdon C-tube, grade A phosphor bronze
accuracy	±1% for middle half of scale, ±2% for first and last quarters
geared movement	302 and 304 stainless steel
lens	optically clear polycarbonate
pointer	high visibility with a pointer calibration hub
contact/circuit rating	2A @ 30 VDC 1A @ 125 VAC
General:	
maximum ambient temperature	150°F / 66°C
approximate shipping weight	2.5 Kg
electromagnetic compatibility	to 89/336/EEC

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

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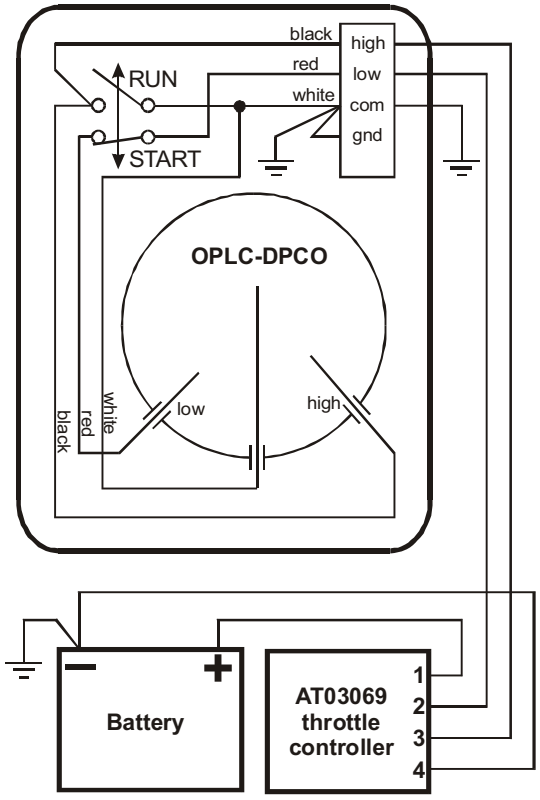
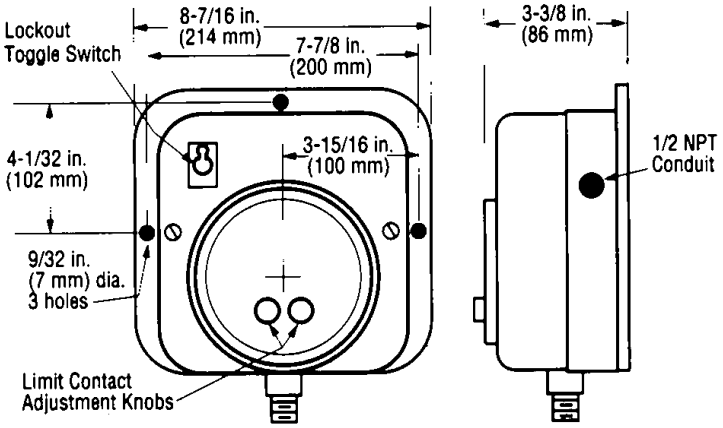
UK - ISO9001:2000 FM 29422

Electrical connection



Dimensions



How to order

Model/stock ref.	*Description*
OPLCDPCO 20BAR	¼" NPT, 0 – 20 Bar scale
OPLCDPCO 200PSI	¼" NPT, 0 – 200 PSI/14 Bar scale
OPLCDPCO 300PSI	¼" NPT, 0 – 300 PSI/20 Bar scale

Additional equipment:-

AT03069	Throttle controller, 12/24 VDC
PD8183 1/4 X 1/4	Pulsation dampener, ¼" NPT fittings

Warranty

A two year limited warranty on materials and workmanship is given with these Murphy product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**.

Further information

Document	*Title*
OPL-96001B	OPL series Swichgage® bulletin (full range)
OPL-9109N	OPL series Swichgage® installation
AT-04052B	AT-03069 throttle controller bulletin
AT-04060N	AT-03069 throttle controller installation
PD-95145B	PD8100 series pulsation dampener bulletin

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

OPLFC-D
'Dirty Water' Pressure Swichgage®

ys6374
3rd June 2004
catalogue section 05

- **OPLFC with 316 stainless steel diaphragm**
- **Designed for slurry or 'dirty water' applications**

Description

The OPLFC-D pressure Swichgage® is intended for systems with liquid that is mildly corrosive or contains semi-solids. Typical applications include slurry and 'dirty water' irrigation and pump systems.

The design uses a standard Murphy OPLFC Swichgage mounted on a heavy duty 316 stainless steel diaphragm. The OPLFC-D combines a 4.5 inch / 114mm pressure gauge with adjustable high and low limit contacts: the visible contacts have a self-wiping action for positive and reliable electrical switching.

Pressure hose connection is via a 1" BSPT fitting in the diaphragm base. The OPLFC-D is available with an optional mounting bracket.

Further information

Document	*Title*
OPL-96001B	OPL series Swichgage® bulletin (full range)
OPL-9109N	OPL series Swichgage® installation

How to order

Please specify model OPLFC-D and pressure range:-

dual scale (psi/bar) ranges	*single scale (bar only) ranges*
0 – 160 psi / 0 – 11 bar	0 – 11 bar
0 – 200 psi / 0 – 14 bar	0 – 14 bar
0 – 300 psi / 0 – 20 bar	0 – 20 bar

Accessories:-

MM3264 – wall/surface mount bracket for OPL

Product specification

Case:	
material	die-cast aluminium, weatherproof
paint finish	polyurethane, red
process connection	1 inch BSPT to diaphragm, 316 stainless steel on wetted parts
Movement:	
dial	4.5 in. (114mm)
scales	white text on black background, see 'how to order' for ranges
sensing element	Bourdon C-tube, grade A phosphor bronze
accuracy	±1% for middle half of scale, ±2% for first and last quarters
geared movement	302 and 304 stainless steel
lens	optically clear polycarbonate
pointer	high visibility with a pointer calibration hub
contact/circuit rating	2A @ 30 VDC 1A @ 125 VAC
General:	
maximum ambient temperature	150°F / 66°C
overall dimensions (h x w x d)	250 x 140 x 100 mm
approximate shipping weight	2.7 Kg

Warranty

A two year limited warranty on materials and workmanship is given with these Murphy product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**.

MURPHY

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

Exhaust Pyrometers and Pyro-Switches

- **Single or dual display pyrometers**
- **1 to 2% accuracy**
- **Sealed construction**
- **Full range of thermocouples and adaptor fittings**
- **Pyro-switches for automatic alarm or shutdown**

Description

A range of pyrometers, thermocouples and pyro-switches for monitoring exhaust gas temperatures.

Pyrometers

Pyrometers are housed in a 3½ inch (89mm) diameter sealed case, designed for mounting on a bracket or panel front facia. Single and dual scale versions are available: the dual version is designed for use with V-type engines, allowing easy comparison of left and right manifold temperatures.

All units feature an easy-to-read dial with scales in both Fahrenheit and Celcius. The dial face has white scaling and characters on a black background, a bright red dial pointer, and black or stainless steel bezel. No auxiliary power supply is required, except for dial illumination – please specify 12 or 24 VDC.

Thermocouples and accessories

Exhaust temperature measurement is by a K type thermocouple mounted in the engine manifold or exhaust ports. On turbocharged engines, the thermocouple mounts between the engine and turbo. Both grounded and ungrounded thermocouples are available, with a range of screw fittings and extension cables.

Pyro-switches

These compact devices may be use to trigger an automatic alarm or shutdown on high temperature. The pyro-switches may be used with or without the pyrometers. Several model options provide for 12/24V DC power supplies, single/dual inputs or single/dual alarm outputs.

Application

Excessive exhaust temperature is a major damaging factor for all engines. High exhaust temperature is often the result of a poor fuel/air ratio, caused in turn by factors such as over throttling, poor tuning, dirty air filters or a faulty fuel system. Exhaust pyrometers can be used to monitor the exhaust temperature and indicate a fault before major damage occurs. Pyro-switches may also be used to trigger audible alarms or automatic engine shutdown.

MURPHY®

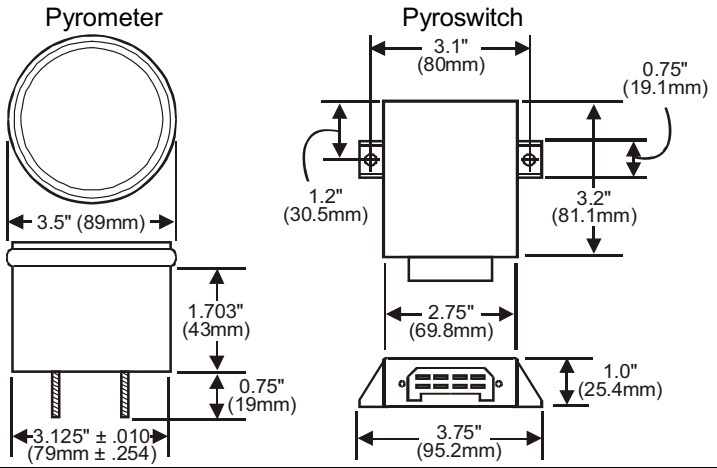
Product specification

Pyrometers:	
input/calibration	for type K type thermocouple, 4 Ohms external resistance, ambient temp. compensated.
indicating scale	single or dual scale, 100° arc, 300 - 1300 °F / 150 - 700 °C white scaling and characters, black background, fire red pointer.
accuracy	2% at full scale 1% at 2/3 scale
ambient operating temp.	–40 to +125°C
dimensions	diagram overleaf
Thermocouples:	
type	K (Chromel/Alumel)
body construction	Iconel, 0.25” (6.4mm) diameter, fusion welded tip
wiring	Q-glass high temp. inner insulator, stainless steel overbraid, approx. 11” (279mm) lead out, colour code: yellow (+ve), red (-ve)
Pyro-switches:	
supply voltage nominal (range)	12 VDC (9 – 15 VDC) 24V DC (18 – 30 VDC)
current consumption	200 mA max. plus output load
set point adjustment	100 – 1800°F (38 – 982°C)
output type	relay switched positive DC supply, NO / NC contacts as indicated
output rating	7.5 Amp non-inductive 4 Amp inductive
ambient operating temp.	–40 to +125°C
dimension	diagram overleaf

Warranty

A one year limited warranty on materials and workmanship is given with this product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**

Dimensions



How to order

When ordering, please specify the stock codes below:-

Pyrometers

stock number	*type*	*indicating range*	*bezel*	*lighting*
00.00.0956-12	single dial	300-1300°F/150-700°C	stainless steel	12V
00.00.0956-24	single dial	300-1300°F/150-700°C	stainless steel	24V
010-413-12	single dial	300-1300°F/150-700°C	black	12V
010-413-24	single dial	300-1300°F/150-700°C	black	24V
00.00.0819-12	dual dial	300-1300°F/150-700°C	stainless steel	12V
00.00.0819-24	dual dial	300-1300°F/150-700°C	stainless steel	24V
010-508-12	dual dial	300-1300°F/150-700°C	black	12V
010-508-24	dual dial	300-1300°F/150-700°C	black	24V

Thermocouples, fittings and lead extensions

stock number	*type*
00.00.0818	grounded, K type, complete with 3/8" NPT adaptor
00.00.3488	ungrounded, K type, complete with 1/4" NPT adaptor
00.00.3577	1/8" NPT thermocouple adaptor
00.00.3450	1/4" NPT thermocouple adaptor
00.00.3578	3/8" NPT thermocouple adaptor
00.00.3579	1/2" NPT thermocouple adaptor
00.00.0817	standard lead assembly, 14 feet
00.00.0817-10	lead assembly, 10 metres
00.00.0817-15	lead assembly, 15 metres
00.00.0817-20	lead assembly, 20 metres
00.00.0817-25	lead assembly, 25 metres

Pyro-switches

Unless requested otherwise, all pyro-switches are supplied with 1100°F standard set point.

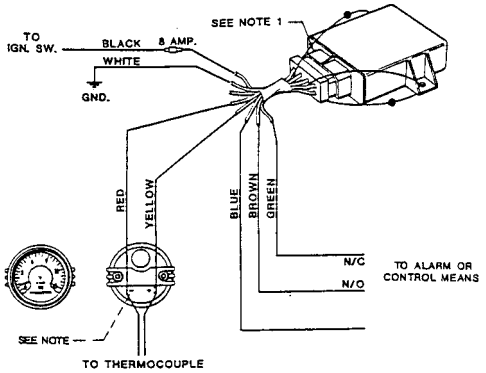
stock number	*supply volts (VDC)*	*inputs*	*outputs*
030-021	12	1	1 (switched DC positive: 1 x NO and 1 x NC)
030-021-1	24	1	1 (switched DC positive: 1 x NO and 1 x NC)
030-017	12	2	1 (switched DC positive: 1 x NO and 1 x NC)
030-017-1	24	2	1 (switched DC positive: 1 x NO and 1 x NC)
030-058	12	1	2 (switched DC positive: 2 x NO and 2 x NC)
030-058-1	24	1	2 (switched DC positive: 2 x NO and 2 x NC)
030-054	12	2	2 (switched DC positive: 2 x NO)
030-054-1	24	2	2 (switched DC positive: 2 x NO)

Accessories

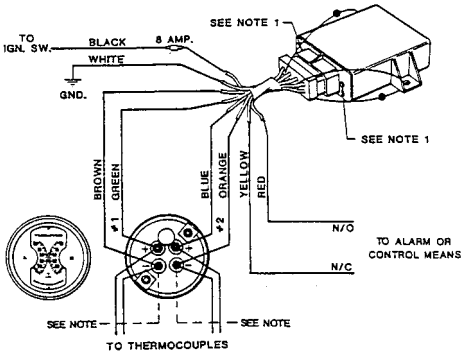
stock number	*description*
030-25	Pyrometer system tester, for testing pyrometers, thermocouples and extension cable, and for field calibration of pyro-switches.

Electrical connection

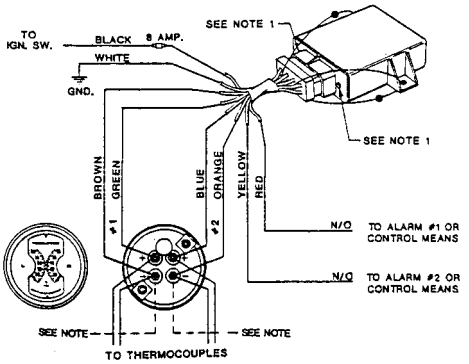
1) Single pyrometer with pyro-switch 030-021(-1)



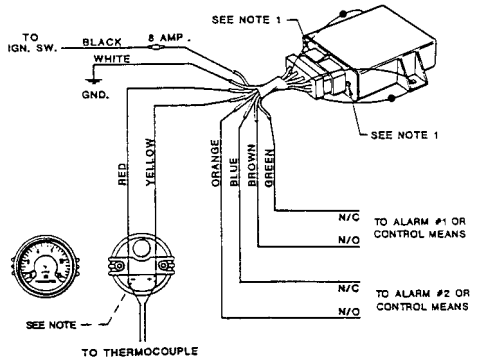
2) Dual pyrometer with pyro-switch 030-017(-1)



3) Dual pyrometer with pyro-switch 030-054(-1)



4) Single pyrometer and pyro-switch 030-058(-1)



Notes:

1) pyroswitches are designed for negative earth systems
2) for ungrounded thermocouples, the pyro-switch negative terminal must be earthed.

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

LR857 series
Oil Level Regulator

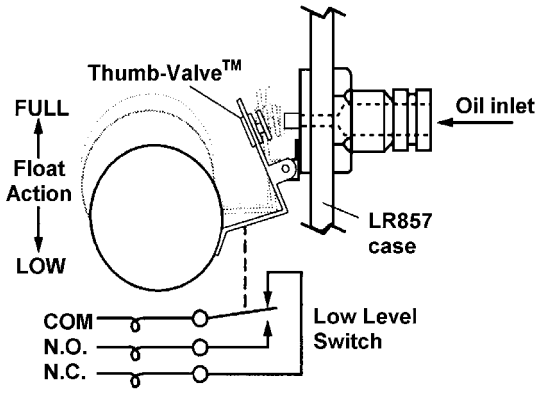
ys6362
revision A, 19th April 2005
catalogue section 15

- **Automatically maintains engine oil level**
- **Visible indication of oil level**
- **Low level alarm / shutdown switch with test facility**
- **Eliminates over/under fill**
- **Simple installation**

Description

The Murphy LR857 oil level regulator provides automatic maintainance of engine crankcase oil level. The device can be used in a range of engine, generator, compressor or pump applications.

When adjusted to the correct (engine running) oil level, the LR857 will automatically replenish oil as it is used. Regulation is by a float and Thumb-Valve™ mechanism:-



The simple and unique Thumb-Valve™ is non-clogging and provides a positive, leak-free seal. The LR857 float mechanism also has an integral low-level switch that provides alarm and/or equipment shutdown if the oil level falls too low. The float switch has a front facia knob that can be turned to test the alarm/shutdown circuit.

The LR857 is housed in a rugged aluminium case and is available with a range of pipe fitting and mounting options.

Warranty

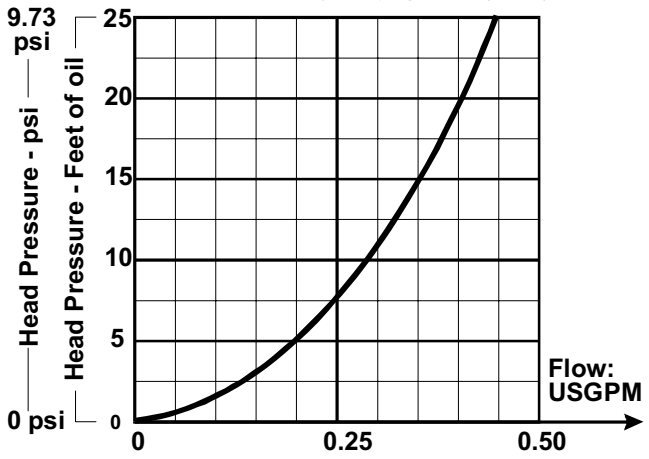
This Murphy product is supplied with a two year limited warranty on materials and workmanship, details available on request and at **www.fwmurphy.co.uk/warranty**.

Specification

Process connection:	
inlet connection	barbed fitting for 16mm / 5/8" ID hose; inside (female) thread 1/4" NPT
outlet connection	3/8" NPT female thread (optional hose fittings available)
Electrical:-	
snap-switch	SPDT volt-free contacts, 5A @ 120 VAC, 2A resistive / 0.75A inductive @ 6 – 36 VDC
Physical:	
case	die cast aluminium
lens	polycarbonate
float	brass
fittings and plugs	brass
shipping dimensions	260 x 170 x 170 mm
weight	0.95 Kg (LR857) to 1.2 Kg (LR857-F-U)

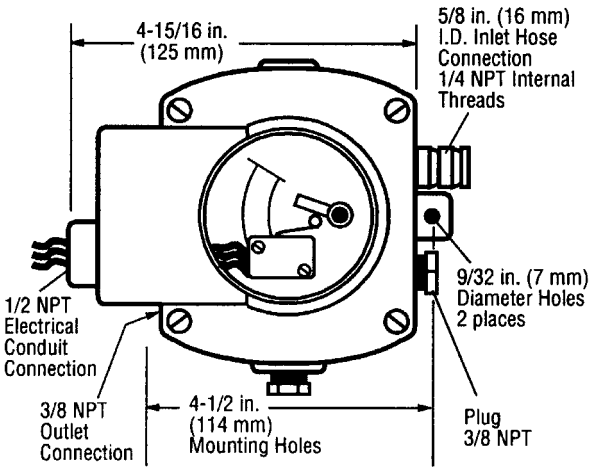
Flow rates

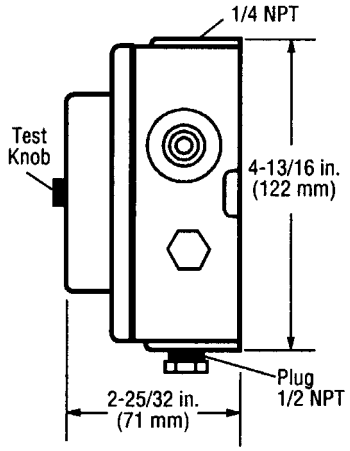
Oil with 0.9 specific gravity @ 21°C(70°F)



FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

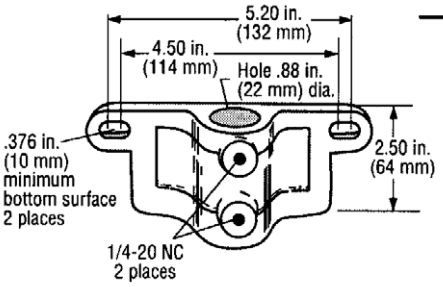
Dimensions





Mounting brackets

Murphy offer two mounting brackets for the LR857.
The 15.00.0235 (or "-P" option) pipe bracket kit fits a 7/8 inch (22mm) diameter pipe (see typical installation below).
The 15.01.0223 (or "-U" option) universal flange kit alows various mounting methods.

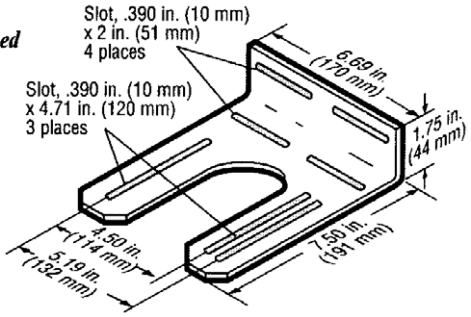


15000238
Pipe Bracket Kit

Additional Hardware Supplied
- (2) *1/4-20 x 7/8 inch (22 mm) screws*
- (2) *1/4-20 x 1 inch (25 mm) screws*
- (4) *1/4-20 hex nuts*
- (4) *1/4 inch (6 mm) dia. split washer*

15010224
Universal Flange Kit

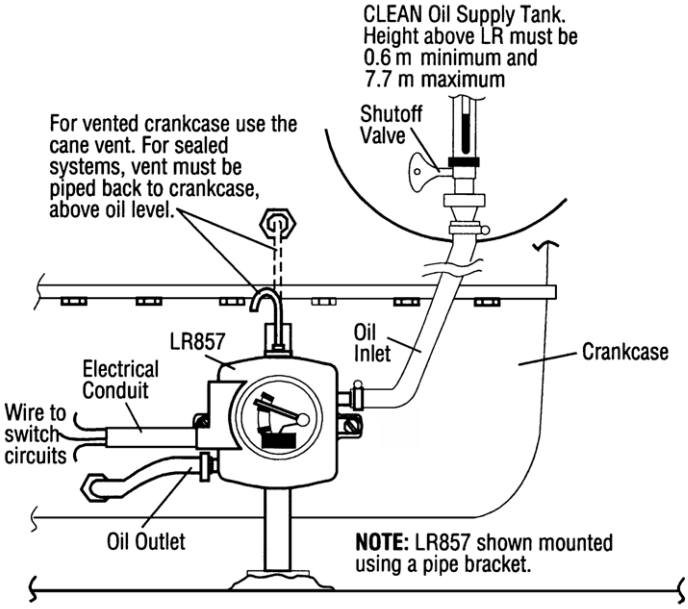
Additional Hardware Supplied
- (2) *1/4-20 x 1-1/4 inch (32 mm) bolts*
- (4) *1/4 dia. flat washer*
- (2) *1/4-20 hex nuts*
- (2) *5/16-18 x 1-1/4 inch (32 mm) bolts*
- (4) *5/16 dia. flat washer*
- (2) *5/16-18 hex nuts*



How to order

stock code	*Description*
Complete units:-	
LR857	Basic model, no extra fittings or mounting bracket
LR857-F	LR857 + fittings kit (15.00.0420 below)
LR857-P	LR857 + pipe bracket (15.00.0238 below)
LR857-U	LR857 + universal bracket (15.01.0224 below)
LR857-F-P	LR857 + fittings kit + pipe bracket
LR857-F-U	LR857 + fittings kit + universal bracket
Spare fittings & mounting bracket kits:-	
15.00.0420	Fittings kit: - 1/4"NPT male x 1/4" (6mm) pipe fitting (vent) - 1/4" (6mm) OD copper cane tube (vent) - 3/8" NPT x 1/2" ID barbed hose fitting (outlet)
15.00.0238	Pipe bracket kit, components as above right
15.01.0224	Universal bracket, components as above right

Typical installation



FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

Magnetic Pickup Speed Transducers

ys6336
8th August 2002
catalogue section 20

- **Precise, reliable engine speed measurement**
- **Options for thread size, body length and connector type**

Description

Accurate speed measurement is a requirement for many engine and generator applications. Murphy magnetic pickups provide an accurate and reliable means of converting rotational speed into a signal that can be measured by electronic control equipment.

Each pickup is positioned close to an engine flywheel or gear wheel. As the metal gear teeth rotate past the pickup pole-piece, an AC voltage signal is generated by the pickup coil; the output signal frequency is proportional to engine speed:-

$$f_{output} = \frac{\text{engine R.P.M. x no. of flywheel teeth}}{60}$$

The signal may be measured by equipment such as Murphy tachometers, speed relays or engine controls, for speed indication, automatic starting, load switching and overspeed tripping.

The pickup must be installed to give an output voltage that is sufficient for the control equipment being used. Output voltage is dependent on a factors such as the type of pickup, its proximity to the gearwheel, the gearwheel speed, material and tooth profile, and the electrical load connected to the pickup. For accurate speed sensing, use a two-core shielded cable between the pickup and control unit, with the shield earthed at one end only.

Murphy pickups are available with a range of body sizes, thread sizes and connectors, as detailed overleaf.

How to order

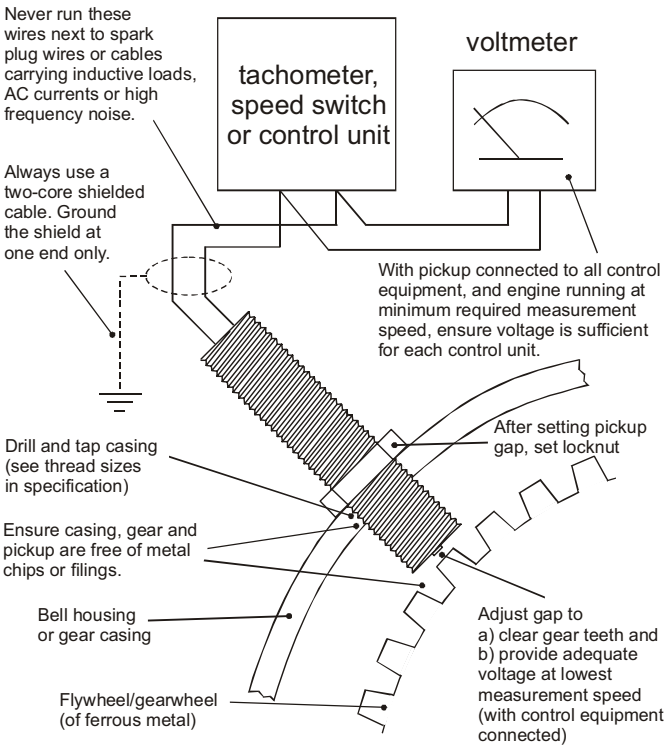
Please refer to the specification chart overleaf then quote the stock code required.

Accessories:-

Stock Code	*Description*
60.WS.2162	Twin screened cable for pickup connection
81.01.2001	5/8” locking nut for MP-3298
68.MP.1NUT	spare 5/8” stainless steel locking nut

Typical installation

For full installation instructions, see document MP-8802N.



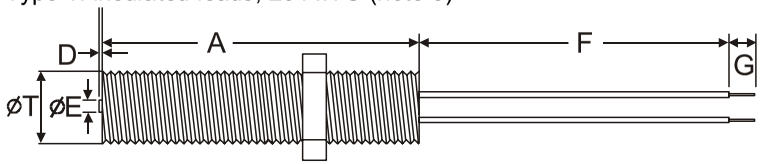
Warranty

Materials and workmanship for this product are covered by a one or two year warranty as indicated overleaf. Full warranty details are available at **www.fwmurphy.co.uk/warranty**.

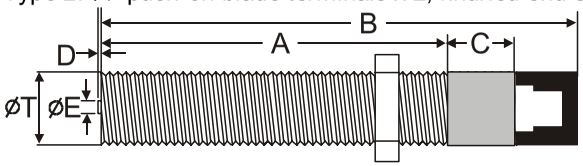
Specifications

Body Types:-

Type 1: insulated leads, 20 AWG (note 6)



Type 2: ¼" push-on blade terminals x 2, knurled end section (C)



	stock code									
	MP3298	**MP7906**	**MP7905**	**68MP0060**	**68MP1815**	**68MP0058**	**68MP0258**	**MP3**	**68MP0158**	**MP5**
Body type	1 (diagram above)			2 (diagram above)						
Body material	Note 1	Note 2		stainless steel						
Locknut material	Note 1	Note 3		stainless steel						
Internal potting	epoxy resin			glass filled Nylon or polypropylene						
Dimensions:-										
T (thread)	5/8"-18 UNF	3/4" x 16 UNF		M16 x 1.5	M18 x 1.5	5/8" x 18 UNF				
A	3.00" (76 mm)		4.5" (114 mm)	1.89" (48 mm)			3.00" (76 mm)		5.00" (126.5 mm)	
B	n/a			2.76" (70 mm)			3.94" (100 mm)		5.91" (150 mm)	
C	n/a			10 mm						
D	0.030"(1.0 mm)	1.0 mm		0.4 mm nominal						
E	0.108" (3 mm)	0.108" (3 mm)		0.125" (3.17 mm)						
F	min. 12" (305 mm)			n/a						
G	0.25" (6 mm)	0.37" (9 mm)		n/a						
Coil resistance	975 Ohms typ.	2500 Ohms typ.		350 Ohms nominal						
Coil inductance	400 mH typ. @ 1kHz	800 mH max. @ 1kHz		150 mH nominal						
Nominal output	20 V p-p typ. (note 7)			20 V p-p typ. (notes 8, 9)						
Operating temp.	-54 to +107°C (-65 to +225°F)			-20 to +120°C (-4 to +248°F)						
Weight (approx.)	66g	91g	117g	57g	79g	57g	74g		109g	
Warranty	2 years			1 year						
Additional notes (see below)	6	6	6					4		5

Notes:-

1. Type 300 stainless steel
2. Type 6061 aluminium/anodise class I
3. Steel, nickel plated
4. MP3 = 68MP0258 plus fibre washer and terminal dust boot
5. MP5 = 68MP0158 plus fibre washer and terminal dust boot
6. Insulated leads, 20 AWG, STR/TEF insulated per MIL-W-16878D type E, 1 white and 1 black: white lead is positive with respect to black lead on approach of ferrous metal
7. Output for 20 pitch gear @ 100 inches per second, 0.005" gap and 100 KOhm load
8. Output for 60 tooth, 6" diam, mild steel gear wheel @ 1000 rpm, with 0.01" gap and 10 KOhm load
9. 30mm/second minimum speed required to generate 100mV p-p under conditions of note 8

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

3ST
Three point speed relay

ms5885
(supersedes ms5884 / M040301)
revision D, 20th March 2003
catalogue section 20

- **Three speed relays in one compact unit**
- **Wide operating frequency**
- **Engine RPM meter output**

Description

The 3ST provides three independent speed relays in one compact unit. It is designed to work with an engine mounted speed transducer, typically a magnetic pickup. The 3ST measures the transducer signal frequency (which is proportional to engine speed) and compares this with three user-set trip levels. The three non-latching relays then activate or deactivate as appropriate.

Each relay circuit has a front facia LED that lights when the relay is energised. On standard units, the relay functions are designated S1 (crank), S2 (underspeed) and S3 (overspeed): all three relays are energised, and all LEDs lit, when the engine is running at normal speed - see diagram overleaf for relay/LED operation.

Nominal speed calibration and relay trip levels are set via four multi-turn potentiometers - see 'calibration' overleaf. The 3ST also features a 'meter' output, which may be used for calibration and/or engine speed indication.

The 3ST has a robust, polycarbonate case, designed for DIN rail or surface mounting. Electrical connection is by 12 screw terminals, suitable for stripped panel wires or narrow blade crimps.

Application

The 3ST is designed for use with engines, generators, pumps or any moving machinery where speed related control that requires accurate and repeatable.

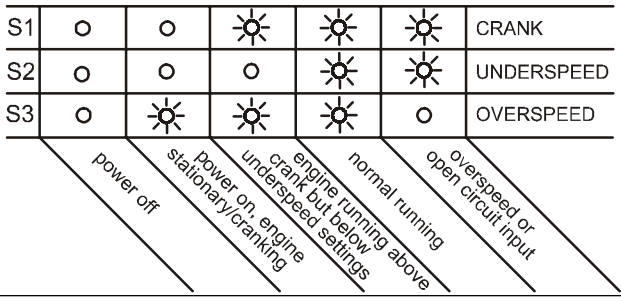
Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

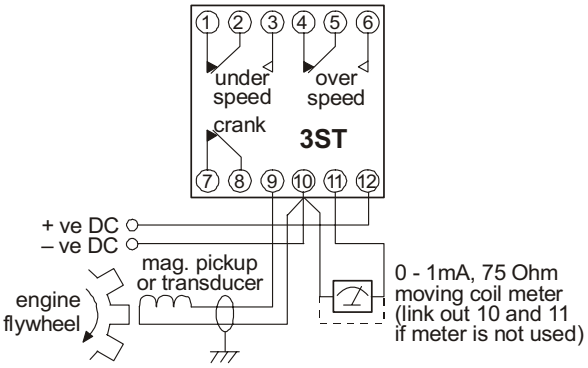
Specification

Power supply:	
voltage range, 12 V units	8 – 16 V DC
24 V units	16 – 32 V DC
power consumption	4 W typ.
Input:	
voltage range	0.5 – 80 V AC rms
nominal frequency range (f_o)	1 – 8 kHz. Special 'L' (10 – 200 Hz) and 'M' (200 – 1500 Hz) variants available for volume orders
Trip settings:	
S1 (crank) range	10 – 45 % of f_o
S2 (underspeed) range	50 – 95 % of f_o
S3 (overspeed) range	100 –130% of f_o
trip point hysteresis	2.5% of setting (typ.)
Outputs:	
relays	SPNC (S1) and SPDT (S2 & S3) volt free contacts, 5A max. @ 24V DC (resistive load), 2 x 10^5 operations
tacho/calibration	0 – 1 mA into a 75 Ohm moving coil meter. Output at normal engine speed = 0.75 mA
General:	
operating temperature	–10 to +55 °C
dimensions (W x H x D)	50 x 75 x 110 mm
weight	approx. 190 g

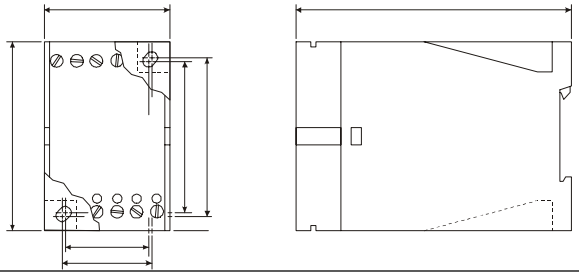
Relay operation/LED indication



Electrical connection



Dimensions



How to order

Stock Units

These are supplied with blank calibration labels and set to a nominal frequency (f_O) of 3000Hz (equivalent to 120 flywheel teeth at 1500 RPM). These units will usually therefore require customer calibration:-

Stock code	Model / description
76.70.0039	3ST/1SET4 speed trip, 24V, std. settings
76.70.0068	3ST/2SET4 speed trip, 12V, std. settings

Special Calibration

We can also supply the 3ST calibrated to your requirements. Please specify:-

a) **Model type:** 3ST/1 (24V) or 3ST/2 (12V)
b) **Nominal transducer frequency (f_O)**
c) **Trip levels for S1, S2 and S3**, expressed as either:
   i) an absolute (transducer) trip frequency (in Hz), or
   ii) a percentage of f_O

Calibration

For the 3ST to correctly measure engine speed, it must be calibrated for each particular engine and transducer type.

Calibration may be carried out during engine commissioning, or 'on the bench' using a signal generator to simulate the engine speed transducer. This is a two stage process:-

a) Nominal calibration

*Use the **METER ADJUST** potentiometer to calibrate the 3ST to the 'nominal' transducer frequency (or f_O, the transducer output frequency when the engine is running at normal speed). Standard units allow adjustment of f_O between 1 and 8 kHz.*

When calibrating with a signal generator, f_O must be known, either a) by prior measurement of the pickup when the engine is running, or b) by calculation - e.g. for a pickup and flywheel:-

$$f_O \text{ (Hz)} = \frac{\text{normal engine speed}}{60} \times \text{number of flywheel teeth}$$

To set the nominal calibration:-

- *Connect the pickup, transducer or signal generator input: signal positive to pin 9, signal negative to pin 10*
- *Connect a 0 – 1mA meter (ideally with a 75 ohm moving coil action): meter positive to pin 11, meter negative to pin 10.*
- *Connect the DC power supply: positive DC to pin 12, negative DC to pin 10. Switch on the supply.*
- *Start the engine manually (not under the control of the 3ST relays) and run to normal speed, or adjust the signal generator to simulate the transducer signal.*
- *Turn the METER ADJUST potentiometer until the meter reads 0.75mA. Turn the pot. clockwise to increase the meter reading (i.e. to lower the nominal calibration frequency). All LEDs should now be lit.*

The nominal calibration is now complete. The meter may be left connected to the 3ST or replaced with a wire link.

b) S1, S2 and S3 relay settings

*Once the nominal calibration (f_O) has been set, use potentiometers **S1**, **S2** and **S3** to set the trip frequency of each relay. The adjustment range of each pot. is fixed in percentage terms to f_O (see specification for ranges); the absolute frequency range and setting of each relay will therefore change if f_O is changed.*

For each of the 3 relay settings:-

- *Adjust the engine speed to the required trip level, or adjust the signal generator to simulate the transducer frequency at the required engine speed.*
- *Adjust the potentiometer (S1, S2 or S3) until the relay just changes over (the LED will light then extinguish). Turn each pot clockwise to increase the trip frequency.*

The 3ST is now calibrated. For full details of 3ST calibration, please see our separate installation instructions

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

20.SS Series
Shock/Vibration switch

- **Shock and vibration protection**
- **Adjustable sensitivity**
- **Explosion proof case, approved to ATEX EN50014/50018, EEx-d-IIC-T6**

English

Murphy ATEX series shock/vibration switch

- Protects equipment from excessive shock and vibration
- Fine adjustment to select the degree of sensitivity
- ATEX certified enclosure
- Remote reset option

Description

The ATEX Series are electro-mechanical devices designed to protect equipment from damaging shock. These sensitive mechanisms detect excessive shock and shutdown the equipment before further damage occurs. A set of contacts is held in a latched position through a magnetic latch mechanism. As the level of shock increases an inertia mass exerts force against the latch arm and forces it away from the magnetic latch causing the latch arm to separate and to operate the contacts. Sensitivity is obtained by adjusting the air gap between the magnet and latch arm plate.

The ATEX Series are housed in a ATEX certified enclosure and can be used for applications requiring an execution of EEx-d-IIC-T6.

Applications

Applications for the ATEX Series include any stationary machinery or equipment where excessive shock can be damaging or poses a threat to normal operations. Typical applications:

- Cooling fans
- Engines
- Pump Jacks
- Compressors
- Pumps
- Rotating and reciprocating machinery

Français

Contacteur/détecteur de chocs et de vibrations de la série ATEX

- Protège votre installation contre un excès de chocs et de vibrations
- Degré de sensibilité réglable
- Boîtier certifié ATEX
- Option réarmement à distance

Description

Les contacteurs/détecteurs de la série ATEX sont des dispositifs électromécaniques conçus pour protéger votre installation contre tous dégâts dus à des chocs. Ces mécanismes très sensibles détectent tous chocs excessifs et arrêtent votre installation avant qu'elle ne soit endommagée. Un ou plusieurs contacts sont maintenus enclenchés par un mécanisme de blocage mécanique et magnétique. Quand le niveau de vibrations ou de chocs augmente une masse d'inertie exerce une force sur le bras de blocage qui se dissocie du verrouillage magnétique, le levier de blocage actionne ainsi les contacts. La sensibilité des contacts est obtenue en ajustant l'entrefer entre l'aimant et le disque du levier de verrouillage.

Les détecteurs de la série ATEX utilisent un boîtier certifié ATEX et peuvent être utilisés sur des applications nécessitant une réalisation EEx-d-IIC-T6.

Applications

Les applications utilisant ces détecteurs comprennent tous types de machines tournantes stationnaires ou mobiles pouvant être endommagées par un excès de chocs ou de vibrations telles que :

- Aéroréfrigérants
- Moteurs
- Pompes de puits de pétrole
- Compresseurs
- Pompes
- Machines tournantes ou alternatives

Español

Interruptores de vibración Murphy serie ATEX

- Protege el equipo de vibraciones excesivas
- Fácil ajuste para seleccionar el rango deseado de sensibilidad
- Gabinete certificado ATEX
- Opción de restablecimiento remoto

Descripción

La serie ATEX es un dispositivo mecánico diseñado para proteger equipos de excesiva vibración. Estos sensibles mecanismos detectan vibraciones excesivas y paran el equipo antes de que ocurra un daño mayor. Un conjunto de contactos es sostenido en posición retraida a través de un mecanismo magnético. Al mismo tiempo que el nivel de vibración se incrementa, una masa inerte ejerce una fuerza contra el brazo palanca y lo forza, alejándolo de la posición retraida, causando que el brazo actuador se separe y opere los contactos. La sensibilidad se obtiene ajustando el espacio entre el magneto y el brazo actuador.

La serie ATEX está contenida dentro de un gabinete certificado ATEX, el cual puede ser aplicado en áreas EEx-d-IIC-T6.

Aplicaciones

Las aplicaciones para la Serie ATEX abarcan cualquier maquinaria estacionaria o equipo en donde la vibración excesiva pueda dañar las operaciones normales del mismo, tales como:

- Ventiladores en torres de enfriamiento
- Motores
- Bombas Jack
- Compresores
- Bombas
- Maquinaria rotativa y reciprocante

Italiano

Interruttori di vibrazioni Murphy serie ATEX

- Proteggono gli equipaggiamenti da eccessive vibrazioni
- Regolaziono fine del valore di intervento
- Contenitore con certificazione ATEX
- Reset a distanza a richiesta

Descrizione

Gli interruttori di vibrazioni della serie ATEX sono progettati per proteggere da eccessive vibrazioni l'equipaggiamento sul quale sono montati. I contatti di allarme (microinterruttori) sono mantenuti nella posizione di normale funzionamento per mezzo di un sistema magnetico. Quando il livello delle vibrazioni supera il valore prefissato, il magnete permanente si separa da una piastrina metallica montata sul supporto di sostegno dei microinterruttori provocando il loro intervento e, di conseguenza, l'attivazione di sistemi per l'arresto della macchina. La regolazione del punto di intervento viene effettuata variando la distanza tra il magnete permanente e la piastrina metallica sopracitata.

Gli interruttori di vibrazioni della serie ATEX sono montati in un contenitore con certificazione ATEX e possono essere usati per applicazioni che richiedono una esecuzione EEx-d-IIC-T6.

Applicazioni

Gli interruttori di vibrazioni della serie ATEX sono idonei per tutte le macchine o equipaggiamenti dove vibrazioni eccessive possono provocare gravi danni.

Principali applicazioni :

- Torri di raffreddamento
- Motori diesel e a gas
- Compressori
- Pompe
- Macchine rotanti ed alternative

Options:-

Remote Reset

Allows reset of a tripped unit from a remote location. Available for 115VAC or 24VDC. Can be used to override nuisance tripping on start-up.

Space Heater

Prevents moisture condensation inside the ATEX housing.

Specifications

ATEX Case: Copperfree Cast Alloy (IP55)
Electrical Connection: M20 x 1.5
Contact Ratings:
5A @ 125 - 480 VAC;
0.5A @ 125 VDC;
0.25A @ 250 VDC;
2A resistive, 1A inductive @ 0 - 30 VDC.
Manual reset models:
2 SPDT microswitches.
Remote reset models:
1 SPDT microswitch.
Sensitivity Range: 0 to 7 g (depending on mounting position)
Operating Temperature:
-40°C to +60°C
Certification Body: KEMA
Standard: EN 50014 / 50018 ATEX
Execution: EEx-d-IIC-T6
Shipping Weight: 3.5 kg
Shipping Dimensions:
250 × 250 × 250 mm

Warranty

A two year limited warranty on materials and workmanship is given with this product. Details available on request.

How to Order

To order one of the 20SS series shock switches, use the table below.

Options:-

Réarmement à Distance

Permet le réenclenchement à distance d'un mécanisme décroché. Disponible en 115 Vca ou 24 Vcc. Peut être également utilisé pour annuler les décrochements intempestifs au démarrage.

Résistance Chauffante

Evite la condensation à l'intérieur du boîtier.

Spécifications

Boîtier ATEX: Fonte d'aluminium sans cuivre (IP55)
Raccordement Electrique: Entrée diamètre M20 x 1,5
Pouvoir de Coupure:
5A @ 125 - 480 Vca;
0.5A @ 125 V cc;
0.25A @ 250 V cc;
2A résistif, 1A inductif @ 0 - 30 Vcc.
Modèle à réarmement manuel :
2 contacts inverseurs unipolaires SPDT
Modèles à réarmement à distance :
1 contact inverseur unipolaire SPDT
Plage de sensibilité: 0 à 7 g (cela dépend de la position de montage)
Température de Fonctionnement:
-40°C à +60°C
Certification: KEMA
Standard: ATEX EN 50014 / 50018
Exécution: EEx-d-IIC-T6
Poids à l'Expédition: 3,5 kg
Dimensions à l'Expédition:
250 x 250 x 250 mm

Garantie

Une garantie de 2 ans est proposée sur les produits fabriqués Murphy. Nous contacter pour une copie.

Comment Commander

Pour commander un détecteur de la série 20SS, utiliser le tableau ci-dessous :

Opciones:-

Restablecimiento remoto

Permite el restablecimiento de una unidad desactivida desde un punto remoto. Disponible para 115 VCA o 24 VCD. Es usado para facilitar la operación durante el arranque.

Calentador interno

Previene la condensación de la humedad dentro del gabinete del ATEX.

Especificaciones

Gabinete ATEX: Fundición en aleación libre de cobre (IP55)
Conexión Eléctrica: M20 x 1.5
Rango de Contactos:
5A @ 125 - 480 VCA ;
0.5A @ 125 VCD ;
0.25A @ 250 VCD ;
2A resistivos, 1A inductivo @ 0 - 30 VCD
Modelos de restablecimiento manual con microswitches de 2 SPDT
Modelos de restablecimiento remoto con microswitch 1 SPDT
Rango de Sensibilidad: 0 a 7 g (dependiendo de la posición del montaje)
Temperatura de Operación:
-40°C a +60°C
Certificación de Gabinete: KEMA
Estándar : EN 50014 / 50018 ATEX
Areas: EEx-d-IIC-T6
Peso: 3.5 kg
Dimensiones: 250 x 250 x 250 mm

Garantía

Murphy ofrece una garantía limitada de dos años en materiales y mano de obra, la cual se da con este producto. Los detalles se le proporcionarán cuando usted los solicite.

Para Ordenar

Para ordenar la Serie 20SS de interruptores de vibración, por favor, haga referencia a la siguiente tabla:

A Richiesta:-

Reset a distanza

Consente di ripristinare a distanza il funzionamento, di un interruttore intervenuto per eccessive vibrazioni. Tensioni di alimentazione disponibili 115 Vca e 24Vcc. Può anche essere utilizzato per evitare l'intervento all'avviamento.

Resistenza anticondensa

Previene la formazione di condensa all'interno dell'interruttore ATEX.

Caratteristiche Tecniche

Contenitore: Fusione in lega senza rame (IP55)
Connessione Elettrica: M20 x 1,5
Portata Contatti:
5A @ 125 - 480 Vca;
0.5A @ 125 V cc;
0.25A @ 250 V cc;
2A resistivo, 1A induttivo @ 0 - 30 Vcc.
Modelli con reset manuale:
2 microinterruttori SPDT
Modelli con reset a distanza:
1 microinterruttore SPDT
Campo di Regolazione: 0 / 7 g (in funzione della posizione di montaggio)
Temperatura di Funzionamento:
-40°C / + 60°C
Certificazione: KEMA
Norme: EN 50014/50018 ATEX
Esecuzione EEx-d-IIC-T6
Peso (con imballo): 3,5 kg
Dimensioni (con imballo):
250 x 250 x 250 mm

Garanzia

2 anni su materiali e difetti di fabbricazione. Dettagli disponibili a richiesta.

Per Ordinare

Per ordinare uno degli interruttori della serie 20SS, preghiamo di riferirsi alla seguente tabella :

Model	Manual Reset Réarmement Manuel Restablecimiento Manual Reset Manuale	24 Volt DC Remote Reset Réarmement à distance 24 Vcc Restablecimiento Remoto a 24 VCD Reset a distanza 24 Vcc	115 Volt AC Remote Reset Réarmement à distance 115 Vca Restablecimiento Remoto a 115 VCA Reset a distanza 115 Vca	24 Volt DC Space Heater Résistance Chauffante 24 Vcc Calentador interno para 24 VCD Resistenza anticondensa 24 Vcc	115 Volt AC Space Heater Résistance Chauffante 115 Vca Calentador interno para 115 VCA Resistenza anticondensa 115 Vca	240 Volt AC Space Heater Résistance Chauffante 240 Vca Calentador interno para 240 VCA Resistenza anticondensa 240 Vca
20.SS.0001	✓					
20.SS.0002	✓			✓		
20.SS.0003	✓				✓	
20.SS.0004	✓					✓
20.SS.0005	✓	✓				
20.SS.0006	✓	✓		✓		
20.SS.0007	✓	✓			✓	
20.SS.0008	✓	✓				✓
20.SS.0009	✓		✓			
20.SS.0010	✓		✓	✓		
20.SS.0011	✓		✓		✓	
20.SS.0012	✓		✓			✓

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS & SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

INDUSTRIAL PANEL DIVISION
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

PS660 Irrigation Control Panel

ss6404
revision B, 3rd January 2006
catalogue section 30

- **Manual start/stop of engine-driven irrigators**
- **Automatic shutdown by timer, 'no flow' or engine/pump fault**
- **Automatic throttling to operator-set speed or pressure**
- **Weatherproof enclosure or flat-panel options**

Description

The PS660 is a microprocessor-based control, instrumentation and protection system for engine-driven irrigation pumps. The system provides all the features of the Murphy mechanical 33.400.689 panels (see bulletin ss6254), plus automatic engine throttling to maintain a set pump pressure.

Model B6452 is a flat-panel design for mounting in an acoustic enclosure. The panel includes the main PS660 control module, an on/off power keyswitch, supply fuses, output slave relays and a 2 metre wiring harness with screw terminal connector strip.

Model B6453 has the same control features, but is supplied in a weatherproof, lockable enclosure, complete with emergency stop push button and a clear window for viewing the main control module. Electrical connection is via a screw terminal strip inside the panel.

Operator control of both panels is through the PS660 control module. 5 push keys – Stop, Start, Mode, ▽ and △ – allow engine starting and stopping, selection of Idle or Duty running modes, and the increase or decrease of run time, target speed (in Idle mode) or target pressure (in Duty mode).

Pump shutdown, with optional 'cooldown' delay, can be by manual operator control, or can be automatic following a 'no-flow' condition, expiry of the 'run' time, or an engine/pump fault.

The PS660 control module has a 32 character backlit LCD for the display of operating mode, time delays, fault messages, target and actual pump pressures, engine speed/oil pressure/ coolant temp and hours run. Amber and red LEDs indicate warning and shutdown conditions.

Warranty

A two year limited warranty on materials and workmanship is given with this product. Full details are available at **www.fwmurphy.co.uk/warranty**

MURPHY®

Product specification

Power supply:	
operating voltage: steady state range	5 – 40 V DC continuous
crank brown-out	to 0 V for >=100mS
current consumption: standby (typ)	95mA @ 12V, 55mA @ 24V
cranking (typ)	280mA @ 12V, 170mA @ 24V
Inputs:	
engine oil pressure & engine coolant temperature	Murphy resistive senders (see 'accessories' below), wired to negative DC
pump water pressure	4 – 20 mA / 0 – 600 psi transmitter
no flow, aux input 1 shutdown and aux input 2 warning	switch contacts, closing to negative on fault
magnetic pickup:-	
voltage range	2.5 – 25 V AC rms
frequency measurement range	0 – 10 kHz.
engine RPM display accuracy	<= 2% of full scale
engine RPM display resolution	10 RPM
Outputs:	*(all ratings for resistive load)*
start, fuel and preheat:	positive DC, switched relay:
B6452/B6453 slave relays	30 Amp @ 24V DC (per output), or 40 Amp @ 24V DC (combined outputs).
control module 41.70.012(	8 Amp @ 24V DC (per output), or 8 Amp @ 24V DC (combined outputs).
throttle up, throttle down and common alarm	negative DC (semiconductor), 500 mA max. @ 33 V DC
Physical:	
dimensions (W x H x D), weight	
enclosed panel (B6453)	400 x 500 x 240 mm, 17.5 Kg
open chassis (B6452)	362 x 384 x 195 mm, 3.9 Kg
control module (41.70.0126)	144 x 96 x 160 mm, 750 g
operating ambient temperature	–10 to +55 °C
Accessories supplied:	
magnetic pickup, 68.MP.0058	5/8" x 18 UNF, 48mm long
oil pressure sender, 00.00.3042	0-100 psi, 1/8" NPT, 2 wire
engine temp sender, 10.09.0051	0-150°C, 5/8" UNF, 2 wire
pump pressure transducer, PXT600	0-600 psi, 4-20mA, 1/4" NPTF

Operating parameters

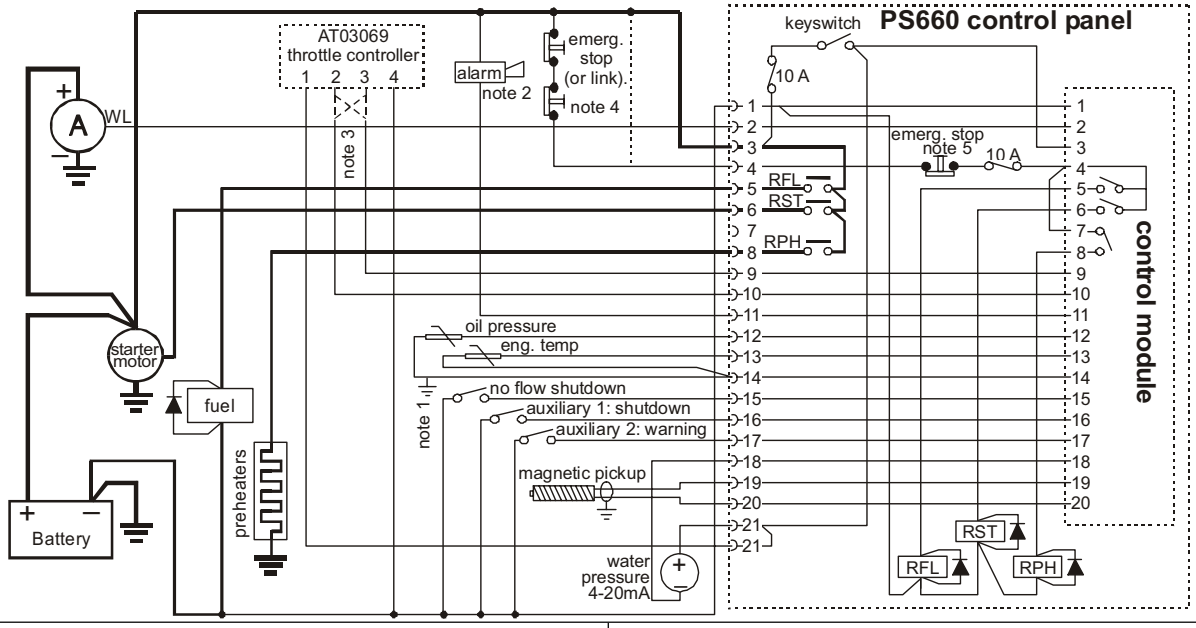
Function	*setting range/options*
Non-adjustable	
engine crank/rest time	10 sec (max) crank, 5 sec rest
start attempts	3 (max)
automatic crank release	500 RPM
low oil pressure shutdown	< 20 psi
high coolant temp. shutdown	> 98 °C
charge alt. (WL) fail voltage	10V
Adjustable (in normal operation)	
run time	1 min to 48 hrs, or 'constant'
target speed (idle mode)	min = 500 RPM, max = 4000 RPM or overspeed level minus 500 RPM
target pressure (duty mode)	50 to 550 psi
Adjustable (in program mode)	
preheat time	0, 5, 10 or 15 seconds
engine override time	3 – 60 sec (1 sec steps)
pump override time	10 sec to 60 min (1 sec steps)
cooldown time	0 sec to 10 min (1 sec steps)
pressure units	PSI or BAR
pump high pressure shutdown	50 – 550 psi (10 psi steps) or 3 – 39 bar (0.5 bar steps)
overspeed shutdown	1000 – 4000 RPM
throttle deadband	0-500 RPM (idle) / 0-200 psi (duty)
throttle up/down rate	1 (slow) to 5 (fast)

Electrical connection

Panel electrical connection is via a screw terminal strip. On model B6452, the terminal strip is at the end of a 2m wiring harness; on model B6453, the terminal strip is fixed inside the weatherproof enclosure. The terminal numbering for both panel versions (and control module) is as follows:-

1	Battery negative power supply
2	Charge alternator WL
3	Battery positive power supply, 5 to 40 VDC
4	Battery positive relay feed / emergency stop
5	Fuel output, positive DC
6	Starter (crank) output, positive DC
7	- - No connection - - (+ve feed for preheat on control module)
8	Preheat output, positive DC
9	Throttle up output, negative DC (transistor, 500mA max)
10	Throttle down output, negative DC (transistor, 500mA max)
11	Common alarm output, negative DC (transistor, 500mA max)
12	Oil pressure resistive sender ground
13	Engine temp resistive sender
14	Sender common return/ground
15	No flow input: shutdown (close to negative to activate)
16	Auxiliary 1 input: shutdown (close to negative to activate)
17	Auxiliary 2 input: warning only (close to negative to activate)
18	Pump pressure 4 – 20 mA (0 – 600 psi) transducer negative
19	Magnetic pickup speed input negative
20	Magnetic pickup speed input positive
21	Battery positive keyswitch output (2 terminals provided)

Typical connection



How to order

stock code	*model / description*
B6452	PS660 irrigation panel, flat-panel version, supplied complete with:- - **68.MP.0058** magnetic pickup - **00.00.3042** 100 psi oil pressure sender - **10.09.0051** 150°C engine temp sender - **PXT600** pump pressure 4-20mA transmitter
B6453	Weatherproof enclosure version of above.
B6452-D **B6453-D**	Dirty water versions of above, with diaphragm on PXT600 transmitter
41.70.0126	PS660 control module only

Further information

document	*description*
si6396	PS660 installation and operation
ys6336 00-02-0181	magnetic pickup sales bulletin magnetic pickup installation
ys6347 EG21-96048N	EG(S) electric gauge and ES sender bulletin EG/ES series installation
PXT-01041B PXT-01044N	PXT pressure transducer sales bulletin PXT pressure transducer installation

Further information on our range of irrigation control equipment is available at **www.fwmurphy.co.uk/irrigation**

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

Irrigation Pump Diagnostic Centres

B4111 Diagnostic Centre

Our standard control panel for engine driven pump irrigation:-

- **Lockable enclosure, weatherproof to IP55**
- **Pump run timer, adjustable up to 24 hours**
- **Swichgage® engine oil pressure indication/shutdown**
- **Swichgage® engine temperature indication/shutdown**
- **Engine hours run counter**
- **Pump pressure Swichgage®, with high/low adjustment**
- **Off-Run-Preheat-Start Keyswitch**
- **12 or 24VDC operation**

The 4 position keyswitch allows manual starting and stopping of the pump. The 'pump run' timer may be used for automatic shutdown after a preset time. Auto shutdowns are fitted for:-

- Low pump pressure, set by adjustable Swichgage®. The design also allows for shutdown triggered by a customer supplied 'no-flow' switch.
- High pump pressure, set by adjustable Swichgage®
- Timer expired, or (customer supplied) emergency stop contact

Also included:-

- Low pump pressure override-on-start timer, 0 – 15 mins
- Charge warning lamp
- Fuse holder
- Pre-punched apertures for upgrade with tachometer and/or auto throttling pressure Swichgage® (available separately).
- Provision for customer supplied emergency stop circuit
- Tubing kits for pressure Swichgages®

B4111

B5001 Diagnostic Centre

As B4111 above but supplied as an open backed chassis (less lockable panel), ideal for mounting in an acoustic enclosure.

B0188 Diagnostic Centre

The original Murphy 33.400.689 irrigation pump panel, fitted in a standard steel enclosure with anti-vibration mounts. Specification is otherwise similar to B4111, but without the hours run counter and pre-punched upgrade apertures. Available with an optional 3 metre wiring harness, model B3459.

33.400.689

How to order

For details of your nearest Murphy irrigation controls stockist, please contact our UK sales office:-

tel: +44 (0)1722 410055
fax: +44 (0)1722 410088
email: sales@fwmurphy.co.uk

or visit our website **www.fwmurphy.co.uk/irrigation**

Accessories

PD8183 water pressure pulsation dampener, 1/4NPT fitting
RP75 rackpuller for fuel cut-off

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**.

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

B6455 Autostart Pump Panel

ss6414
revision A, 1st March 2006
catalogue section 30

- **Auto pump start/stop from high and low float contacts**
- **Engine fault shutdown protection and indication**
- **Engine speed tachometer and overspeed protection**
- **IP54 weatherproof enclosure**

Description

Panel B6455 provides automatic or manual control, instrumentation and protection for 12V DC diesel-driven pumps. The panel includes:-

- Sheet steel, black-painted, IP54 enclosure
- Murphy ASM170 control module with customised program, for engine auto start/stop and fault protection. Includes LED indicators: (low) oil pressure, (high) engine temperature, failed to start, overspeed, engine running, preheat.
- Security keyswitch, Manual–Off–Auto
- Murphy ATHS-30-12-C combined tacho and hourmeter
- Charge alternator lamp, for alternator excitation and failure warning.
- Power supply fuse holder and 10A fuse.
- Integral 10-way, 700mm wiring harness for engine control connections.
- 2 x 4-way sockets on the front facia (complete with removable weatherproof covers) for connection of auto start and auto stop float level switches. 2 x 4-way plugs (complete with removable weatherproof covers) are supplied loose for use on the float switch wiring harness.

Operator control is through the Manual-Off-Auto keyswitch:-

Manual	Gives an immediate, automatic start of the pump and continuous running.
Off	Removes power the ASM170 control module, giving an immediate engine stop or fault reset.
Auto	Pump auto start/stop controlled by remote float level switches. Default set-up is for auto start and auto stop by separate, momentary closing remote contacts, but ASM170 can be configured for use with a single closed-to-start, open-to-stop contact.

MURPHY®

Product specification

Power supply:	
operating voltage: ASM170 controller ATHS tachourmeter	12V DC nominal 6 to 16 VDC continuous 11.6 to 16 VDC continuous
current consumption: standby (typ) cranking (typ)	*(N.B. excludes output load)* 7 mA @ 12V 250 mA @ 12V
Inputs:	
engine low oil pressure & high coolant temperature	closed to negative DC on fault
magnetic pickup voltage range:-	1.5 – 14.4 V AC rms
autostart and autostop	momentary closed to start/stop
Outputs:	*(all ratings for resistive load)*
fuel	positive DC, smart-FET, 10A max, for 'energised to run' fuel controls
preheat and crank	positive DC, switched relay, 5A max per output
combined output (fuel, preheat and crank)	10A max, protected by replaceable supply fuse
Settings:	
crank/rest time (ASM pot R1)	10 secs (adjustable 1 - 25 sec)
crank attempts (ASM switches)	3 (adjustable to 5, 10 or 255)
lockout delay (ASM pot R5)	10 secs (adjustable 1 – 300 sec)
minimum run time (ASM pot R4)	5 mins (adjustable 0 – 60 mins)
crank release freq. (ASM pot R3)	13 – 2300 Hz
overspeed freq. (ASM pot R2)	13 – 8500 Hz
tachometer calibration	70 to 225 teeth (pulses per rev)
Physical:	
overall dimensions (W x H x D)	170 x 250 x 165 mm
approx. weight	2.7 Kg
operating ambient temperature	–10 to +55 °C
Accessories (supplied loose):	
magnetic pickup 68.MP.0060	thread: M16 x 1.5 length: 48mm connection: 6mm spade
preheat slave relay	SPNO relay, max 60A @ 12 VDC
starter slave relay	SPDT relay, max 30A @ 12 VDC

The ASM170 control module gives an automatic (starter motor) crank release in both manual and automatic start modes, using a flywheel/gearwheel mounted magnetic pickup to sense engine speed. Pickup model 68.MP.0060 is supplied loose with each panel.

The automatic engine start sequence comprises:-

- 3 crank attempts (adjustable to 5, 10 or 255)
- 6 second preheat (non-adjustable)
- 10 sec crank/rest time (adjustable 1 to 25 secs)

If the module fails to sense engine speed after the set number of start attempts, a Failed To Start fault is signalled.

The magnetic pickup circuit also feeds the ATHS tacho/ hourmeter. Tachometer calibration, and the ASM170 crank release and overspeed shutdown levels, must be set during panel commissioning.

Engine low oil pressure and high engine temperature faults are sensed by connection of remote fault switch or Murphy Swichgage contacts (not supplied), closing to negative DC during fault.

The following are supplied loose with each panel:-

- 1 x 60 Amp (preheat) and 1 x 30 Amp (starter solenoid) slave relays, for external connection when preheat and crank solenoid loads exceed the panel outputs' 5 Amp ratings.
- 68.MP.0060 magnetic pickup, for speed sensing
- 2 x 4-way connectors with terminal covers, for use in the float switch wiring harness.
- Circuit diagram and product specification

Warranty

A two year limited warranty on materials and workmanship is given with this product. Full details are available at **www.fwmurphy.co.uk/warranty**

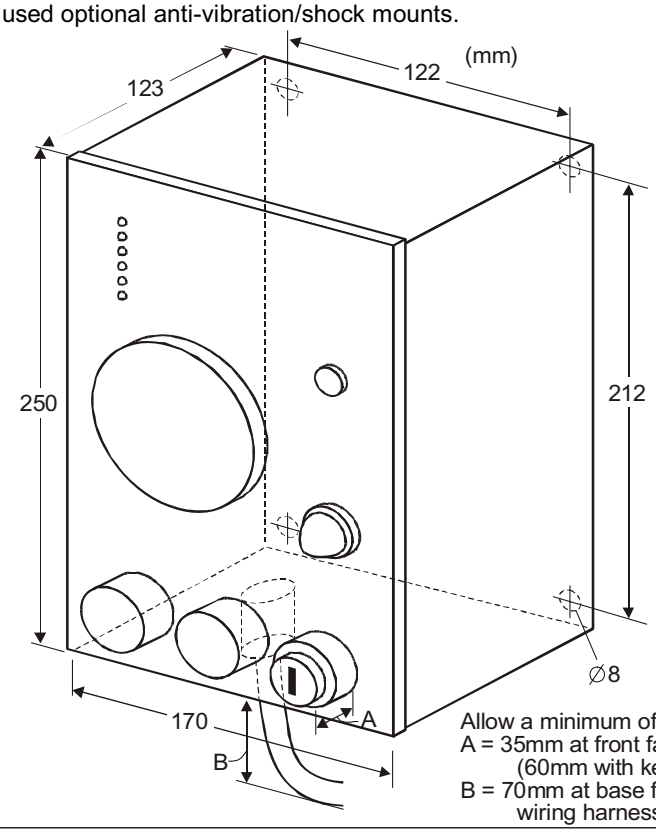
Electrical connection

Panel-to-engine electrical connection is via a 10-way, 700mm wiring harness with numbered leads as detailed below. A full wiring diagram (SE6448) is supplied with each panel:-

1	Battery positive power supply, 12 VDC (10A max)
2	Battery negative power supply
3	Crank output, positive DC (5A max.)
4	Preheat output, positive DC (5A max.)
5	Fuel output, positive DC (10A max.)
6	Charge alternator WL
7	Magnetic pickup speed input positive
8	Low oil pressure input, closed to negative on fault
9	High engine temperature, closed to negative on fault
15	Magnetic pickup speed input negative

Dimensions

Position the panel in a location that minimises extremes of temperature or ingress of moisture and dust/dirt. Where required, used optional anti-vibration/shock mounts.



How to order

stock code	*model / description*
B6455	Pump control panel, supplied complete with magnetic pickup, slave relays and wiring harness connectors.
Accessories:-	
91.12.0038	Optional shockmounts, ¼" UNC (up to 4 may be required)
60.WS.2162	Magnetic pickup screen cable, per metre

Further information

document	*description*
SE6448	B6455 circuit diagram
ASM-03021B	ASM170 control module sales bulletin
ASM-03024N	ASM170 control module installation
TAH-97026B	AT series tachometers sales bulletin
TAH-97029N	AT series tachometers installation
ys6336	magnetic pickup sales bulletin
MP-8802N	magnetic pickup installation

Full information for the above and other products is available at **www.fwmurphy.co.uk/products**

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

Engine Diagnostic Centres

General purpose engine control panels

The Murphy Diagnostic Centre range provides operator controlled starting and stopping of an engine, with automatic shutdown protection in the event of a fault. Several standard control panels are available, offering various levels of engine instrumentation and fault protection.

Operator control is via a four position keyswitch (OFF-RUN-HEAT-START). The key is removable in the OFF position. All panels include a Murphy magnetic switch with front facia dust boot. This latching switch removes power from an 'energised to run' fuel device (not supplied), shutting down the engine on detection of oil pressure or temperature faults. Additional safety switches can be easily added to the shutdown circuit. A DC supply fuse and charge alternator warning lamp are also fitted as standard.

Entry-level panels are designed for use with engine mounted oil pressure and coolant temperature fault switches (not supplied). Intermediate and advanced panels use Murphy Swichgages®: these provide indication of oil pressure (0 – 100 psi) and water temperature (50 - 120ºC), and allow customer settable shutdown trip levels. The oil pressure Swichgage® is supplied with a 2 metre oil line, 1/8" NPT fitting; the temperature Swichgage® includes a 2 metre capillary with 1/2" NPT fitting. Options are also available with an engine hours run counter or combined 'tachourmeter'.

All Diagnostic Centres are housed in a black painted, robust sheet steel enclosure, with shockmounts provided as standard. Circuit diagrams are supplied with each panel.

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

How to order

For price and availability, please contact our UK sales office:-

tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk

For standard models, please quote the stock number shown in the feature chart right.

Custom variations, automatic control panels and fuel shutoff devices are also available. Please contact our Sales department to discuss your requirements.

Accessories:-

Stock code **1H6082** – 10 way, 4 metre wiring harness

Feature reference

Stock number	Panel series	Supply volts (VDC)	Hinged front panel	Keyswitch (Off-Run-Heat-Start)	DC fuse	518-APH magnetic shutdown switch	Charge lamp	20P oil pressure Swichgage® & line	20T water temperature Swichgage®	Hours run counter	Tachourmeter	Spare 2" gauge position
B3173	33-140	12		●	●	●	●					
B6091	33-140	24		●	●	●	●					
B5232	38-170	12	●	●	●	●	●	●	●	●		
B6175	38-170	24	●	●	●	●	●	●	●	●		
B5922	38-200	12	●	●	●	●	●	●	●		●	●
B6178	38-200	24	●	●	●	●	●	●	●		●	●

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

751602 / 751603 series
Engine and Pump Diagnostic Centres

ss6351
24th April 2003
catalogue section 30

- **Fault protection panels for engines and pumps**
- **Swichgage® indication and automatic fault shutdown**
- **Compact and easy to install**

Description

751602 and 751603 panels provide simple and reliable fault protection for engine-driven and pump applications.

The panels use the accurate and dependable Murphy Swichgage® for status indication and adjustable limit fault shutdown. Both panels feature Swichgages® for engine oil pressure (0 - 100 psi / 7 Bar) and coolant temperatures (50 - 120°C), plus a front facia emergency stop push-button. Model 751603 additionally has a 0 - 20 Bar water pressure Swichgage®, with user-adjustable shutdown limits for high and low pump pressure.

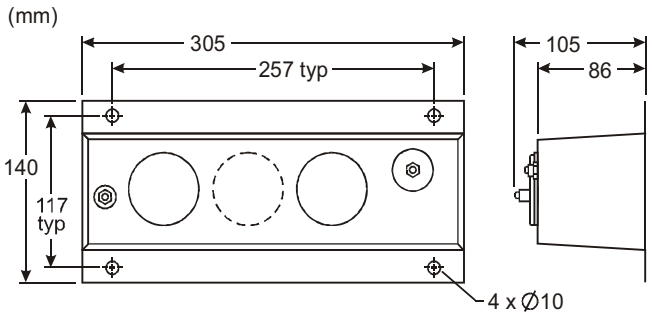
The 75160 series is designed for use with 12V engines with energised-to-run type fuel solenoids. Automatic fuel shutoff is by use of Murphy 518APH magnetic switch contacts. The switch is manually held in reset during engine/pump startup, but will release and latch following an engine fault.

75160 panels use a rugged black plastic, surface-mounted casing. Standard models are supplied complete with a 2 metre oil line and adaptors, 3 crimped wires for electrical connection (battery positive, negative and fuel/shutdown output) and a wiring diagram. A 2 metre water pressure utility line is additionally supplied with the 751603.

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**.

Dimensions



How to order

Stock code	*Model/description*
B2647	751602 panel, 0 - 100psi, 50 - 120°C
B2643	751603 panel, as 751602 plus 0 - 20 bar pump pressure Swichgage®

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

WD100/WD270 series
Engine and Pump Protection Panels

ss6349
revision B, 24th November 2003
catalogue section 30

- **Engine and pump protection for mobile or stationary applications**
- **Swichgage® indication and automatic shutdown**
- **Instant shutdown or warning before shutdown**
- **Compact and easy to install**

Description

The WD100 and WD270 series panels are a rugged, dependable solution for engine or pump fault protection. Their compact size and ease of installation make these panels highly suited to the protection of mobile or stationary engine-driven applications such as tractors, PTO devices, earth moving equipment and pumps.

WD series panels use the accurate and reliable Murphy Swichgage® for indication and fault shutdown. All WD panels feature Swichgages for oil pressure (0 - 100psi / 0 – 7 bar) and coolant temperature (50 – 120°C). Options are also available for indication/shutdown of pump water pressure (0 – 20 Bar), oil temperature (60 – 140°C) and auxiliary contact shutdown: see 'how to order' overleaf for a full feature reference.

Each panel uses a robust steel, black painted enclosure, fitted with a rotating bracket for ease of installation and use. Mobile equipment warning-before-shutdown versions (WD107/277) are also fitted with a Murphy Selectronic® TL7 flashing alarm light and SAH mini-siren, both of which activate on fault, 30 seconds before an automatic shutdown.

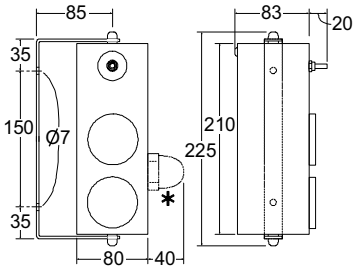
Standard panels are supplied complete with a 2 metre oil line and adaptors, 3 crimped wires for electrical connection (battery positive, battery negative and fuel/shutdown output) and a wiring diagram. The WD series is designed for use on 12VDC engines with energised-to-run type fuel solenoids.

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available at **www.fwmurphy.co.uk/warranty**.

Dimensions

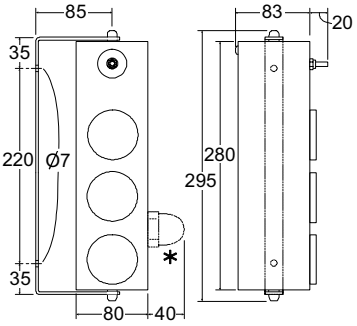
WD100/107



∗ TL7 flashing alarm on WD107 only.

Panel/Swichgage® orientation:-
- vertical in WD100
- horizontal in WD107

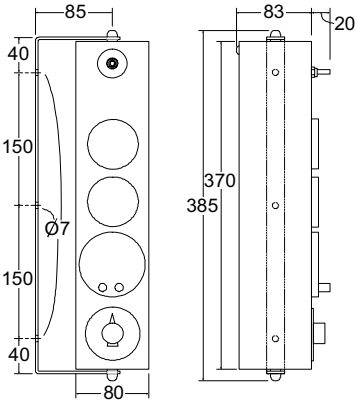
WD270/WD277



∗ TL7 flashing alarm on WD277 only.

Panel/Swichgage® orientation:-
- vertical in WD270
- horizontal in WD277

WD275



Operation

WD100
General engine protection, instant fault shutdown

While starting the engine, hold in the 518APH reset button until the engine starts and the Swichgage® low oil pressure contact clears.

As soon as a low oil pressure or high coolant temperature fault occurs, the WD100 will immediately shut down the engine. Rectify the fault causing shutdown, then resume operation.

WD270
Pump applications, instant fault shutdown

Starting

Method 1: hold in the 518APH reset button then start the engine as normal. The reset button may be released when both engine oil pressure and pump pressure have increased above the Swichgages' low limit set points.

Method 2: Before engine starting, temporarily set the low water pressure Swichgage® contact to minimum (so that the contact is open circuit). Press and hold the 518APH reset button during engine starting, then release the reset button once the engine starts and the Swichgage® low oil pressure contact clears. Monitor the pump water pressure until it rises above the low pressure shutdown level, then raise the Swichgage® contact to this low pressure limit.

Running / fault shutdown

As soon as an engine pressure/temperature or pump pressure fault occurs, the WD270 will immediately shut down the engine. Rectify the fault causing shutdown, then resume operation.

WD275
Pump applications, instant shutdown, adjustable timed lockout of low pump pressure on startup

Turn the low pump pressure lockout timer to the required time (0 – 15 minutes), hold in the 518APH reset button, then start the engine. The reset button may be released once the engine has started and the Swichgage® low oil pressure contact has cleared.

Engine low oil pressure, engine high coolant temperature and pump high pressure faults will then cause an immediate engine shutdown. Once the set lockout time has expired, a pump low pressure fault will also cause an engine shutdown. Rectify the fault causing shutdown, then resume operation.

WD107/WD277
Mobile applications, warning before shutdown, auto override of low pump pressure on startup

Start the engine in the normal manner. The red light (TL7) will flash and the Mini-Siren® will sound until the engine starts and lifts the Swichgage® low oil pressure contact.

If the red light comes on or the Mini-Siren® sounds during normal driving it is a warning to shut down the engine as quickly as possible. Otherwise, the panel will shut down the engine automatically within 30 seconds.

After an automatic shutdown, the engine may be restarted in the normal way, but will only run for 30 seconds.

Once the vehicle has been safely stopped, rectify the engine fault then resume normal operation.

How to order

Please select the stock number below based on the features required:-

Stock number	Panel type	Supply volts (VDC)	Magnetic shutdown switch	20P oil pressure Swichgage® (0 - 100psi / 0 - 7 bar)	Oil line, 2m	20T coolant temperature Swichgage® (50 - 120°C) with 2m capillary	20T oil temperature Swichgage® (60 - 140°C) with 2m capillary	Socket & jackplug auxiliary shutdown input	Manual lockout of engine fault on startup	Automatic lockout of engine fault on startup	High/low pump pressure Swichgage® (0 - 20 Bar) with 3m utility line	Manual lockout of low pump pressure on startup	Adjustable 0 - 15 minute lockout of low pump pressure on startup	Instant fault shutdown	Warning before shutdown (flashing lamp and mini-siren)
B2644	WD100	12	✓	✓	✓	✓	✘	✓	✓	✘	✘	n/a	n/a	✓	✘
B2880	WD107	12	✓	✓	✓	✓	✘	✓	✘	✓	✘	n/a	n/a	✘	✓
B6407	WD107	12	✓	✓	✘	✓	✘	✓	✘	✓	✘	n/a	n/a	✘	✓
B2842	WD270	12	✓	✓	✓	✓	✘	✘	✓	✘	✓	✓	✘	✓	✘
B5918	WD275	12	✓	✓	✓	✓	✘	✘	✓	✘	✓	✘	✓	✓	✘
B6300	WD277	12	✓	✓	✓	✓	✓	✘	✘	✓	✘	n/a	n/a	✘	✓

MURPHY

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

AMACS GSM
Remote Communication Panel

ys6338
revision A, 24th June 2004
catalogue section 30

- **Mobile phone, text message control of remote equipment**
- **Dual band GSM coverage**
- **Robust, sealed, lockable panel**

Description

The AMACS GSM is an add-on panel that provides remote, mobile phone based control of essential equipment. The system may be used in a range of vital applications:-

- Water level and irrigation control
- Prompt, automatic warning of plant faults
- Unauthorised entry/intrusion
- Vehicle theft
- Electrical equipment trip operation

Operation

At the heart of the AMACS system is a GSM data modem that allows text communication between the panel and a mobile phone. By sending SMS text messages from a mobile phone, a remote operator is able to configure the AMACS panel, request plant status information and operate the panel's relay outputs.

The two volt free relay outputs may be used to control remote equipment, e.g. to give engine or pump starting, valve operation, fault reset, etc. Remote text commands allow the outputs to be turned on, turned off, or give a 5 second 'pulse'.

The AMACS panel also has two inputs that can be activated by switch or relay contacts in the remote equipment, e.g. after an automatic engine start, or following a fault condition or other event. The inputs can be independently set so that activation or de-activation of each input causes the AMACS to send an appropriate, pre-programmed text message to the user's mobile phone.

The AMACS system is housed in a robust, lockable enclosure complete with a screw-fitted arial. Cable access is through a plate in the panel base: when used with correct glands, the panel is environmentally sealed to IP54.

Product specification

Electrical:	
power supply voltage	9.5 to 14 VDC
power supply current	80mA (quiescent), <200mA (during GSM receive / transmit)
fusing	integral fuse (on circuit board), 1 Amp fast blow (20 x 5)
inputs x 2	open from/close to negative DC (0V)
outputs x 2	volt free relay contacts (1 x SPCO, 1 x SPNO), rated 3A @ 240VAC / 24VDC (resistive load)
Network:	
network suitability:	suitable for all dual band GSM networks – Vodafone, O_2, Orange and T-mobile
SIM card	replacable mini SIM card for GSM network
GSM coverage	dual band coverage suitable for UK, Europe and Asia/Pacific (not suitable for North and South American continents)
Mechanical:	
environmental sealing	IP54 with correct cable entry glands
temperature range	-10 to +50ºC
weight	5.5 Kg
dimensions H x W x D	panel: 300 x 200 x 160 mm aerial: add 120 mm to height
mounting	wall mounted via internal fixings

Warranty

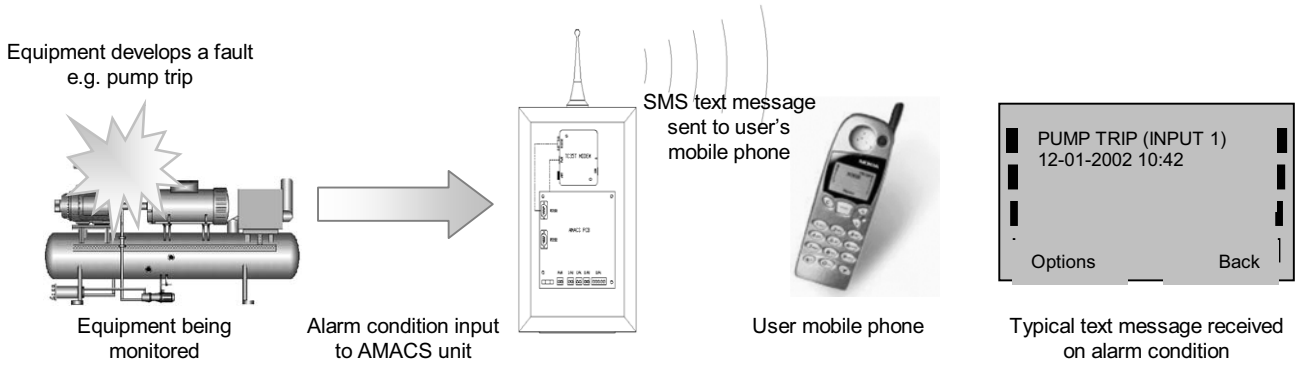
A one year limited warranty on materials and workmanship is given with this product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**.

Communication and control

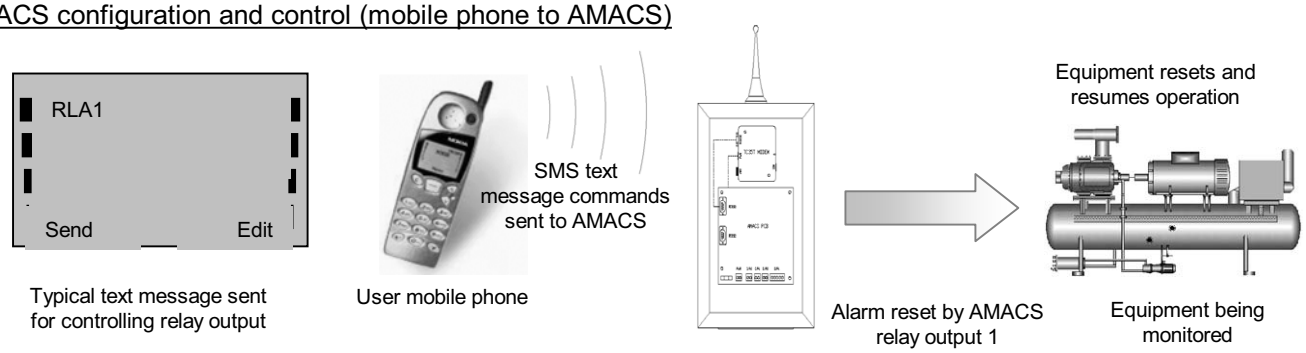
Configuration and control of the AMACS panel is by mobile phone SMS text commands:-

Command format	*Function*
TELA0123456789	Sets the primary dial-out phone number to which text messages are sent.
TELB0987654321	Sets an optional, secondary dial-out phone number.
IPAHabcdefgh	Sets the text message sent when input 1(A) goes 'high' (when input +ve terminal is connected to DC +ve). To prevent any dial-out/message, use command IPAH only (i.e. no message text).
IPALabcdefgh	Sets the text message sent when input 1(A) goes 'low' (when input +ve terminal is made open circuit). To prevent any dial-out/message, use command IPAL only (i.e. no message text).
IPBHabcdefgh	Sets the text message sent when input 2(B) goes 'high' (when input +ve terminal is connected to DC +ve). To prevent any dial-out/message, use command IPAH only (i.e. no message text).
IPBLabcdefgh	Sets the text message sent when input 2(B) goes 'low' (when input +ve terminal is made open circuit). To prevent any dial-out/message, use command IPAL only (i.e. no message text).
RLA1	Energises relay output 1(A)
RLA0	De-energises output relay 1(A)
RLAP	Energises output relay 1(A) for a 5 second 'pulse'. Relay A then de-energises automatically.
RLB1	Energises output relay 2(B) (contacts close)
RLB0	De-energises output relay 2(B) (contacts open)
RLBP	Energises output relay 2(B) (contacts close) for 5 second 'pulse'. Relay B then de-energises automatically.
STAT	After receiving this text command, AMACS hangs up then dials out with full status information.

a) Status or fault notification (AMACS to mobile phone)



b) AMACS configuration and control (mobile phone to AMACS)



How to order

Stock number	***Description***
31.70.0001	AMACS GSM communication panel

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

GsmControl-A
Remote Communication Module

ys6346
revision A, 10th December 2003
catalogue section 30

- **Mobile phone, text message control of remote equipment**
- **Text message notification of remote plant status and faults**
- **Dual band GSM coverage**
- **Configured using SMS or PC**
- **LED indication of input, output and signal status**

Description

The GsmControl-A is a combined GSM (cell phone) modem and input/output module. The module's outputs can be remotely operated using text commands from a user's mobile phone, and text messages can be automatically sent to the remote user's phone on activation of the module's inputs. The GsmControl-A can therefore be used in a range of applications requiring remote control and status notification:-

- Remote start/stop of engine or electrical equipment
- Automatic notification of status changes or faults
- Water level and irrigation control
- Unauthorised entry or intrusion
- Vehicle theft
- Electrical equipment trip operation

Two control outputs are provided in the form of volt-free SPST contacts, suitable for driving most control circuits, e.g. engine start, valve opening, fault reset, etc. The two inputs are designed to work with remote volt-free contacts, and may be configured so that a notification message (as cellphone text or fax) is sent out on contacts closing, opening or both.

Basic configuration of inputs, outputs and phone numbers can be achieved using SMS text commands, but an optional programming kit (PC software and RS232 link hardware) allows more advanced setup, e.g. customised text messages.

Control and configuration of the GsmControl-A is restricted to authorised users only: the module will only respond to text messages that contain an authorised PIN code sent from authorised (pre-programmed) phone numbers.

The GsmControl-A is housed in a compact, DIN rail mounted case. The front facia includes 5 LEDs for indication of input, output and GSM signal status. Electrical connection of the power supply, inputs and outputs is by screw terminals above and below the front facia. An RJ11 telephone type connector provides for connection with the optional programming kit.

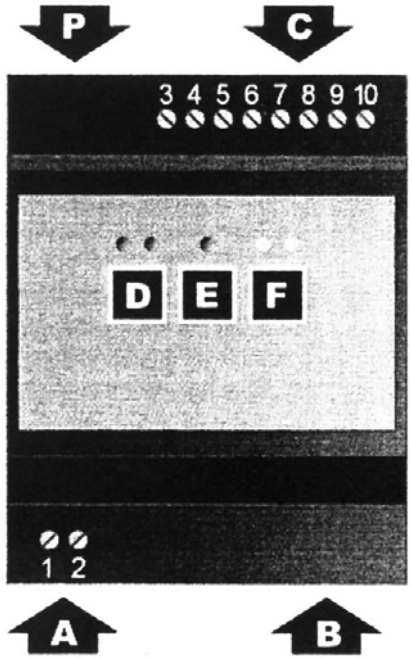
Product specification

Electrical:	
power supply voltage	8 – 38 Vdc / 6 – 29 Vac
power consumption	$3W_{MAX}$ @ 24 Vac 60mA standby, ~100mA peak transmitting
inputs x 2	requires remote SPST contacts, contact rating $40V_{MIN}/20mA_{MIN}$ dc
outputs x 2	SPST volt-free relay contacts, rated 1000VA @ 250 Vac
connection	screw terminals, $2.5mm^2$ (AWG14)
Network:	
network suitability:	suitable for all dual band GSM 900/1800 networks in UK, Europe and Asia Pacific (e.g. Vodafone, O_2, Orange and T-mobile). Not suitable for North and South American continents.
RF output	class 4 (2W) for EGSM900 class 1 (1W) for DCS1800
sensitivity	-102dBm or better
SIM card	mini SIM card for GSM network
General:	
temperature range	-10 to +55ºC
weight	180g
dimensions H x W x D	58 x 71 x 90 mm
mounting	EN-50022 rail 4 modules enclosure
protection class	EN-60529: IP40 (properly fitted)
certification	R&TTE directive 1999/5/EG low voltage directive 73/23/EEC EMC directive 89/336/EEC

The module features an omnidirectional antenna in it's front facia. To avoid loss of signal, the module must not be mounted in a metal control panel or container. Please note: reliability and speed of operation is dependent on local GSM signal strength and network operator message handling. The GsmControl-A **MUST NOT** be used where failed or delayed messages will compromise safety-critical applications.

A full user guide with connection, configuration and operating details is supplied with every module.

Front facia



A. Power supply input
B. SIM card holder
C. Input and output terminals
D. Input LED status indicators
E. GSM operation LED indicators
F. Output LED status indicators
P. RJ11 programming socket

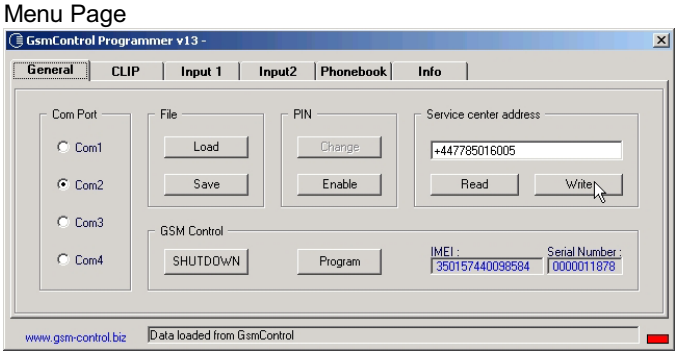
Configuration options

SMS text commands (from cellphone):
- add, replace, delete phonebook entries
- enable and disable input/output options

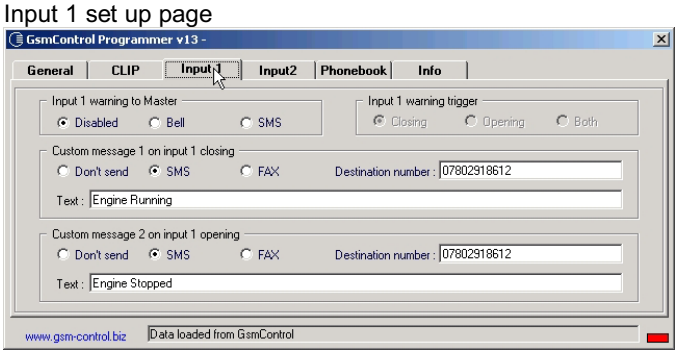
Optional program kit (RS232 link and PC Windows freeware):
- add, replace, delete phonebook entries
- enable and disable input/output options
- write custom event-driven SMS messages

PC configuration freeware

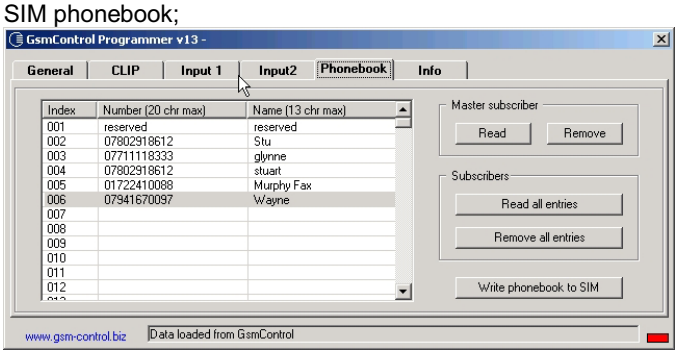
Menu Page



Input 1 set up page



SIM phonebook;



How to order

Stock number	*Description*
31.70.0002	GSM Control-A module
31.70.0003	GSM Control-A programming kit, complete with freeware for Windows®
31.70.0004	GSM Control-A modem SIM card

Warranty

A one year limited warranty on materials and workmanship is given with this product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**.

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

LPC Fire Pump Control Panels

The Murphy LPC control panel range has been designed for use in both diesel engine and electric motor driven fire pump applications. The panels may be used in conjunction with suitable engine or motor equipment to meet the requirements of the Loss Prevention Council and BS5306 specifications. **Note: these panels are NOT suitable for operation with engines built to LPCB rules (January 2004).**

The panels are a direct derivation of our successful EEC family of automatic engine controls, with a proven track record of quality and reliability. Independent automatic and emergency manual control is provided.

Diesel Engine Controls

Automatic starting

A front of panel switch allows selection of either engine battery A or B for automatic starting. The start sequence initiates on momentary opening of a sprinkler pressure switch (with adjustable delay, 0 – 60 seconds) or closing of a remote start contact. Cranking then commences from the selected battery: Crank A and Crank B outputs are designed to control remotely mounted engine start solenoids (not supplied).

Each start sequence comprises a maximum of six cranks of 15 seconds each, with crank rests of 10 seconds. Engine speed is detected using an engine mounted magnetic pickup (supplied) and cranking is automatically discontinued when the engine starts.

The control system also includes the ability to confirm that the starter has successfully engaged. If the battery fails during the six crank attempts, the remaining crank attempts are automatically taken from the other battery. The appropriate battery healthy lamp will be extinguished and a remote 'common fault' signal will be initiated.

Manual test starting

After each automatic start the Manual Test Start Due indicator is illuminated, signalling the requirement for a manual test start. Operation of the Manual Test Start button uses the battery *not* selected for auto start. This indicator extinguishes once the operator has started the pump, and the start button is made inoperative until after the next automatic start.

Remote starting

Manual, remote initiation of an automatic start is available by the simple connection of any number of of remote push button stations. Momentary closure of the contacts will initiate the start sequence; engine stopping must be carried out manually.

Emergency starting

The front facia also features an emergency start button, protected by a quick access cover. When this button is operated, the engine is cranked using power from both sets of batteries.

Product specifications

Diesel controls	
power supply:	
DC supply voltage	12V or 24V nominal
AC charger supply voltage	220/240VAC nominal
inputs:	
low oil press, high eng. temp	close to negative DC to activate
outputs:	
start A, start B	switched positive DC, 5 Amp max. @ 24VDC
on demand, engine running, common fault, audible alarm	single pole contacts, volt free, 5 Amp max. @ 24VDC
physical:	
dimensions (h x w x d)	600 x 600 x 210 mm
enclosure colour	signal red BS 381 C 537
enclosure sealing	IP55
magnetic pickup (standard)	thread: 5/8" UNF; length: 76.5mm
Electric motor controls	
outputs:	
on demand, motor running, mains fail, space heater	single pole contacts, volt free, 5 Amp max. @ 24VDC
physical:	
dimensions	variable – please enquire
enclosure colour	beige RAL 7032
enclosure sealing	IP55

Battery charging

Two battery chargers are provided, each of 5 Amps output rating. The chargers are for use with 220/240 VAC power supply and are fitted complete with a door interlocked isolator and 10 Amp charge ammeters.

Fault indication

Inputs are provided for the connection of engine low oil pressure and high engine temperature fault switches. The appropriate warning indicator lights, and the audible alarm sounds, when either of these inputs is externally switched to battery negative.

Fault indicators are also provided for 'failed to start', 'battery charger A failed' and 'battery charger B failed'. A front panel 'reset' pushbutton allows the fault indication to be cleared.

Electric Motor Controls

These controllers are designed for use with three phase and neutral AC supplies (415VAC phase to phase).

Automatic motor starting is initiated by the opening of a (normally closed) remote pressure contact. Start-delta motor starting consists of a 5 second (adjustable) closure of the star contactor followed by closure of the delta contactor.

Manual, operator initiated motor start is also available using the front facia Emergency Start pushbutton, fitted inside a quick access protective cover.

In the event that the motor is no longer required, the operator may stop the motor by pressing the front facia Stop/Reset pushbutton.

Other features

All panels are manufactured from sheet steel and sealed to IP55. Lugs are provided for mounting on a bulkhead or suitable skid framework.

External electrical connection is made through an unpunched gland plate in the base of the controller to a clearly labelled terminal strip inside. Full circuit diagrams are supplied with each panel.

This product is supplied with a two year limited warranty on materials and workmanship. Full warranty details are available on request and are supplied with each panel.

Control and instrumentation features

Diesel Controllers	Electric Motor Controllers
Panel indicators:-	
• AC healthy (green)	• AC healthy x 2 (green)
• Engine Running (green)	
• Battery A healthy (green)	
• Battery B healthy (green)	
• Low oil pressure (amber)	
• High engine temperature (amber)	
• Battery charger A failed (amber)	
• Battery charger B failed (amber)	
• Manual test start due (amber)	
• On demand (red)	
• Auto start off (red)	
• Failed to start (red)	
Operator controls:-	
• Auto battery selector switch (A or B)	• Emergency manual start pushbutton
• Manual test start pushbutton	• Stop / Reset pushbutton
• Emergency manual start pushbutton	
• Reset pushbutton	
Additional instrumentation:-	
• Tacho/hours run counter	• AC supply ammeter
• 2 x charge ammeters, 0 – 10A	
• Audible annunciator	
Inputs:-	
• Starting pressure switch	• Starting pressure switch
• Remote start	
• Low oil pressure	
• High engine temperature	
• Magnetic pickup	
Outputs:-	
• Crank A (+ DC, 5A)	• On demand (volt free, 5A)
• Crank B (+ DC, 5A)	• Motor running (volt free, 5A)
• On demand (volt free, 5A)	• Mains failure (volt free, 5A)
• Engine running (volt free, 5A)	• Space Heater (volt free, 5A)
• Common fault (volt free, 5A)	
• Audible alarm (volt free, 5A)	
Enclosure:-	
• IP55 sealed enclosure, red	• IP55 sealed enclosure, beige
• Door interlocked isolator	• Door interlocked isolator
• Anti-condensation space heater	• Anti-condensation space heater

How to order

For price and availability, please contact our UK sales office:-

tel: +44 (0)1722 410055
fax: +44 (0)1722 410088
email: sales@fwmurphy.co.uk

Diesel fire pump controllers (note: these stock numbers include supply of 1 x standard 5/8" UNF, 76.5mm (3") magnetic pickup)

Stock number	Description
B3933	LPC diesel control panel, 12V (lead acid)
B3791	LPC diesel control panel, 12V (10 cell NiCd)
B3807	LPC diesel control panel, 24V (lead acid)
B3670	LPC diesel control panel, 24V (20 cell NiCd)

Electric motor fire pump controllers

Stock number	Description
B5257	11 kW electric motor fire pump controller
B4840	15 kW electric motor fire pump controller
B5170	18.5 kW electric motor fire pump controller
B5484	22 kW electric motor fire pump controller
B5103	30 kW electric motor fire pump controller
B5572	37 kW electric motor fire pump controller
B5661	45 kW electric motor fire pump controller
B5702	55 kW electric motor fire pump controller
B5906	75 kW electric motor fire pump controller
B5960	90 kW electric motor fire pump controller
B5610	110 kW electric motor fire pump controller
B5701	132 kW electric motor fire pump controller
B5692	160 kW electric motor fire pump controller

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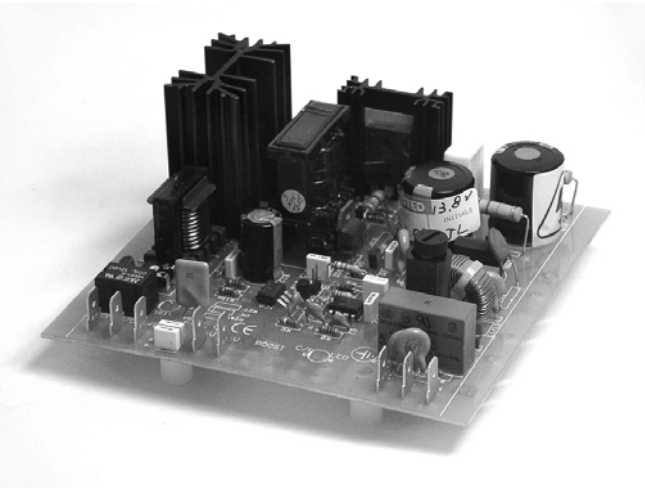
FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

SM82
Automatic Battery Chargers

ys6375
18th October 2004
catalogue section 40

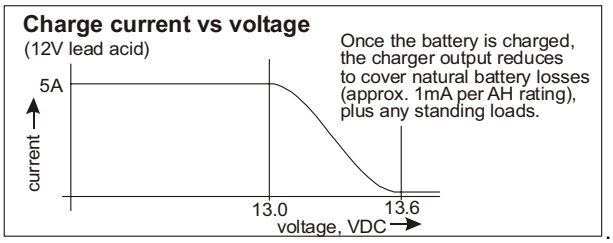


- **High rate, fully automatic float charging: 5A/12V or 3A/24V**
- **Compact, lightweight design**
- **Low ripple output, suitable for lead acid, Ni-Cd or VRLA cells**
- **Float and boost modes**
- **On charge & charge fail outputs**

Description

The SM82 is a fully automatic battery charger / power supply that may be used in a wide range of industrial applications. Switch mode power supply technology provides a compact, lightweight design with high power efficiency and low heat dissipation. Fast, accurate and smooth charging ensures optimum battery life and reliability.

The SM82 is intended for continuous float charging and standby battery applications, including standby engines, pumps and generators. The DC output gives rapid charging at maximum current until the battery reaches a 'knee point' voltage (13 VDC for 12V lead acid). The output then ramps down to its float voltage, maintaining optimum battery charge and supporting static loads up to the maximum rated current:-



The SM82 output has very low ripple (< 1%), allowing safe use with vented lead acid, VRLA, Plante or NiCd batteries.

A 'boost' mode provides an increased voltage output where required. Boost mode is selected by linking two terminals, typically via a remote panel switch or time relay – see calibration table overleaf for details of float and boost voltages.

Two (switched negative relay) outputs are fitted for remote signalling of 'on charge' and 'charge fail' conditions.

The chargers have an open circuit board construction, designed for surface mounting in an enclosed panel. Electrical connection is via 6mm blade terminals. The SM82 is supplied for use with 195 to 277 VAC nominal power supplies, but a moveable circuit board link allows operation with 95 to 135 VAC supplies.

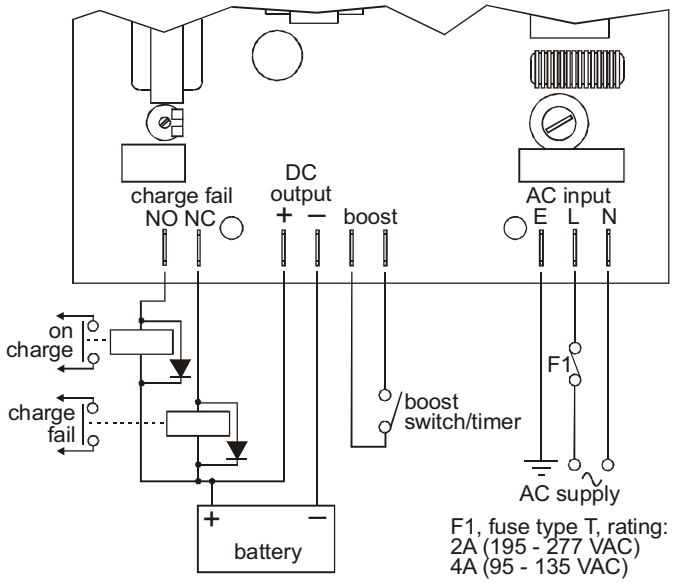
Product specification

power supply:	***SM82125***	***SM82243***
operating voltage range	195 – 277 VAC (240V setting) 95 – 135 VAC (110V setting)	
operating frequency range	47 – 400 Hz.	
DC charge output:		
maximum current, A DC	5	3
nominal voltage, V DC	12	24
float/boost voltages	see table overleaf	
line regulation	< 1%	
load regulation	< 1%	
output ripple	< 1%	
charge fail output:		
configuration	switched negative relay contacts: NC (–ve DC during fault / power down) NO (–ve DC during normal operation)	
contact rating	1A @ 30 VDC (resistive load)	
general:		
operating temperature	–10 to +55 °C	
overall dimensions (w x h x d)	133 x 130 x 70 mm (see diagram overleaf)	
weight	approx. 0.56 Kg (1.24 lbs)	
Electromagnetic Compatibility	89/336/EEC	
Low Voltage Directive	73/23/EEC	

Warranty

A one year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

Electrical connection



Notes:
1) battery output is isolated from earth
2) earth terminal must be connected to a low impedance earth

Calibration

Standard calibrations:-

Battery type		float volts (VDC)	boost volts (VDC)
12V	Lead acid (6 cells)	13.6	14.1
	Ni-Cd (10 cells)	14.1	16.0
24V	Lead acid (12 cells)	27.2	28.2
	Ni-Cd (18 cells)	25.38	28.8
	Ni-Cd (20 cells)	28.2	32.0

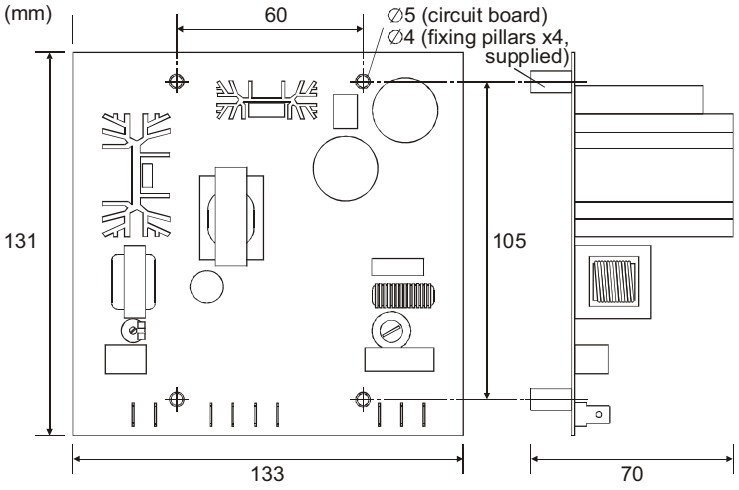
For non-standard calibrations, please contact our engineers.

How to order

When ordering, please specify:-

Stock Number	Description
41.70.0120	240 VAC supply, 12V lead acid, 5A
41.70.0121	240 VAC supply, 24V lead acid, 3A
41.70.0122	240 VAC supply, 10 cell NiCd, 5A
41.70.0123	240 VAC supply, 18 cell NiCd, 3A
41.70.0124	240 VAC supply, 20 cell NiCd, 3A

Dimensions



FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

ys6324
revision A, 11th July 2002
catalogue section 40

BCA series
Automatic Battery Chargers

- **Float charging for vented cells 3 or 5 Amp, 12 or 24 Volt**
- **Simple, low cost design**
- **Lead acid or Ni-Cd calibrations**
- **Optional boost mode**
- **Optional charge fail relay output**

Description

This range of low cost units provides fully automatic, current limited, thyristor controlled charging of vented lead acid or NiCd batteries. The BCA series may be used in a wide range of industrial charging applications, including standby engines, pumps and generators.

The charger uses an economical open-frame construction, designed for surface mounting in an enclosed panel. Each unit consists of a transformer, rectifier and control circuit. The control circuit ensures that charger maintains the battery voltage at the pre-calibrated float level, while supplying any additional load current up to the specified maximum.

The chargers are powered using a 240V or 110V AC power supply (please specify).

Boost option

An optional 'boost' feature may be used to provide an increased output voltage. Selection of normal or boost mode is via three terminals, allowing activation by an external time relay or switch. Float and boost voltages are shown in the calibration table overleaf.

Charge fail option

A self-diagnostic 'charge fail' circuit and relay output is available as an option. The relay energises in the event of a charging fault; volt-free changeover contacts are provided.

Electrical connection of the AC supply, DC output and optional charge fail relay is via shrouded screw terminals. Connection of the optional float/boost selector link is via shrouded 6mm blade connectors.

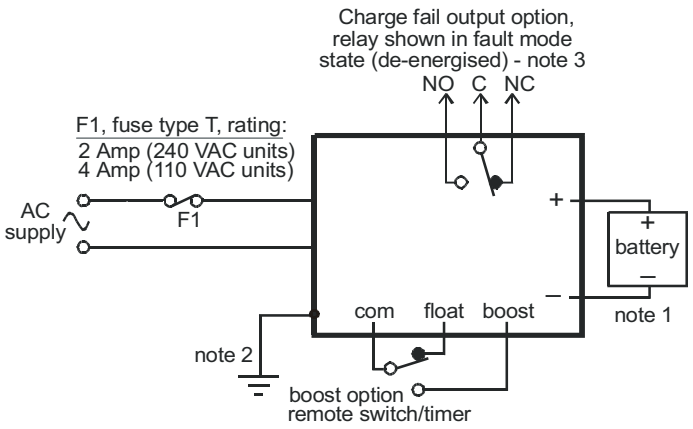
Product specification

power supply:	
nominal operating voltages	110 - 120 VAC (110V units) 210 - 250 VAC (240V units)
permissible voltage variation	± 6% of nominal
nominal operating frequency	50/60 Hz.
DC charge output:	
maximum DC current	model specific, 3A or 5A
nominal DC voltage	model specific, 12V or 24V
float/boost voltages	see table overleaf
charge fail output:	
relay type	volt free SPDT contacts, relay de-energises on fault
contact rating	1A @ 30 VDC (resistive load)
general:	
operating temperature	–10 to +55 °C
overall dimensions (w x h x d)	see table overleaf
weight	see table overleaf

Warranty

A one year limited warranty on materials and workmanship is given with this product. Full details are available on request and at **www.fwmurphy.co.uk/warranty**.

Electrical connection



Notes:

1) battery output is isolated from chassis
2) chassis must be connected to a low impedance earth
3) on models supplied before July 2002, the charge fail relay *energises* during a fault condition.

Calibration

Battery type*		float volts (VDC)	boost volts (VDC)
12V	Lead acid (6 cells)	13.6	14.1
	Ni-Cd (10 cells)	14.2	14.7
24V	Lead acid (12 cells)	27.2	28.2
	Ni-Cd (18 cells)	25.6	26.6
	Ni-Cd (20 cells)	28.4	29.4

***Note: the BCA range is designed for use with vented batteries only. These chargers are NOT suitable for valve regulated lead acid (VRLA) or sealed type cells.**

If in doubt, contact our sales engineers.

How to order

When ordering, please specify:-

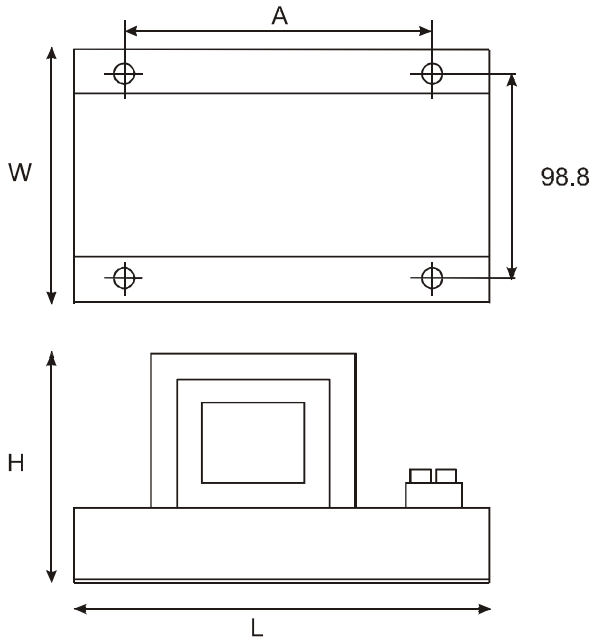
a) Base model:-

Model	Supply voltage, output, calibration
BCA0312/DLA	240VAC, 3A/12V, lead acid
BCA0312/CLA	110VAC, 3A/12V, lead acid
BCA0312/DNC10	240VAC, 3A/12V, 10 cell NiCd
BCA0312/CNC10	110VAC, 3A/12V, 10 cell NiCd
BCA0324/DLA	240VAC, 3A/24V, lead acid
BCA0324/CLA	110VAC, 3A/24V, lead acid
BCA0324/DNC18	240VAC, 3A/24V, 18 cell NiCd
BCA0324/CNC18	110VAC, 3A/24V, 18 cell NiCd
BCA0324/DNC20	240VAC, 3A/24V, 20 cell NiCd
BCA0324/CNC20	110VAC, 3A/24V, 20 cell NiCd
BCA0512/DLA	240VAC, 5A/12V, lead acid
BCA0512/CLA	110VAC, 5A/12V, lead acid
BCA0512/DNC10	240VAC, 5A/12V, 10 cell NiCd
BCA0512/CNC10	110VAC, 5A/12V, 10 cell NiCd
BCA0524/DLA	240VAC, 5A/24V, lead acid
BCA0524/CLA	110VAC, 5A/24V, lead acid
BCA0524/DNC18	240VAC, 5A/24V, 18 cell NiCd
BCA0524/CNC18	110VAC, 5A/24V, 18 cell NiCd
BCA0524/DNC20	240VAC, 5A/24V, 20 cell NiCd
BCA0524/CNC20	110VAC, 5A/24V, 20 cell NiCd

b) Options: CF - Charge Fail, B - Boost

Dimensions, fixing and weights

(mm)



	L	W	H	A	Weight
BCA0312	105	113	90	90	1.2Kg
BCA0512	148	110	100	130	1.87Kg
BCA0324	148	110	110	130	1.85Kg
BCA0524	148	110	110	130	2.62Kg

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

BC1524 and BC3012
Automatic Battery Chargers

ys6307
revision A, 21st October 2004
catalogue section 40

- **Heavy duty float charging: 15A (24V) or 30A (12V) output**
- **Simple, low cost design**
- **Lead acid or Ni-Cd calibrations**
- **Float or boost modes**
- **Charge fail relay output**

Description

The BC1524 and BC3012 range provides fully automatic, heavy duty charging of vented lead acid or NiCd batteries. The chargers may be used in a wide range of industrial battery applications, including standby engines, pumps and generators.

The charger uses an open frame construction, designed for surface mounting in an enclosed panel. Each unit consists of a transformer, rectifier and control circuit. The control circuit ensures that charger maintains the battery voltage at the pre-calibrated float level, while supplying any additional load current up to the specified maximum.

A 'boost' operating mode can be used to provide increased voltage output. Selection of normal or boost mode is via three terminals, allowing activation by a remote panel switch or time relay – see calibration table overleaf for float and boost voltage levels.

A self diagnostic 'charge fail' circuit and relay output is provided as standard. The volt free relay de-energises in the event of a charging fault.

Power for the charger is from a 230VAC or 110VAC supply (please specify at order). All electrical connections are to stripped panel wiring via spring-loaded clamp terminals.

Product specification

power supply:	***BC1524***	***BC3012***
nominal operating voltages	230 VAC or 110 VAC (specify)	
permissible voltage variation	± 10% of nominal	
nominal operating frequency	50/60 Hz.	
DC charge output:		
maximum current, A DC	15	30
nominal voltage, V DC	24	12
float/boost voltages	see table overleaf	
charge fail output:		
relay type	volt free SPDT contacts, relay de-energised on fault	
contact rating	1A @ 30 VDC (resistive load)	
general:		
operating temperature	–10 to +55 °C	
overall dimensions (w x h x d)	185 x 175 x 135 mm	
weight	approx. 7.8 Kg	

Warranty

A one year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

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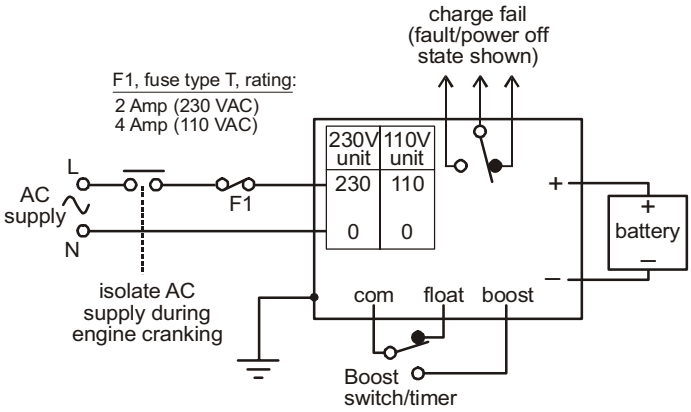
Electrical connection



Notes:
1) battery output is isolated from chassis
2) chassis must be connected to a low impedance earth
3) charge fail relay output is volt-free

Calibration

Battery type*		float volts (VDC)	boost volts (VDC)
12V	Lead acid (6 cells)	13.6	14.1
	Ni-Cd (10 cells)	14.2	14.7
24V	Lead acid (12 cells)	27.2	28.2
	Ni-Cd (18 cells)	25.6	26.6
	Ni-Cd (20 cells)	28.4	29.4

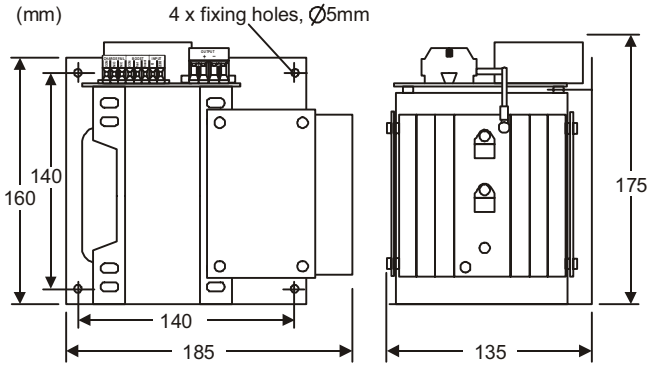
*Note: the BC1524/BC3012 range is designed for use with vented batteries only. These chargers are NOT suitable for valve regulated lead acid (VRLA) or sealed type cells.

How to order

When ordering, please specify:-

Stock Number	Model	Supply voltage, calibration
41.70.0102	BC1524/CLA	110VAC, 24V lead acid
41.70.0103	BC1524/CNC18	110VAC, 18 cell NiCd
41.70.0104	BC1524/CNC20	110VAC, 20 cell NiCd
41.70.0105	BC1524/DLA	230VAC, 24V lead acid
41.70.0106	BC1524/DNC18	230VAC, 18 cell NiCd
41.70.0107	BC1524/DNC20	230VAC, 20 cell NiCd
41.70.0108	BC3012/CLA	110VAC, 12V lead acid
41.70.0109	BC3012/CNC10	110VAC, 10 cell NiCd
41.70.0110	BC3012/DLA	230VAC, 12V lead acid
41.70.0111	BC3012/DNC10	230VAC, 10 cell NiCd

Dimensions



MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

EG21/EGS21 series
Electric Gauges and Swichgages®

ys6347
revision C, 1st July 2003
catalogue section 70

- **Rugged, environmentally sealed design**
- **Indication and alarm for pressure, temperature, fuel, volts and amps**
- **Suited to marine and mobile equipment applications**

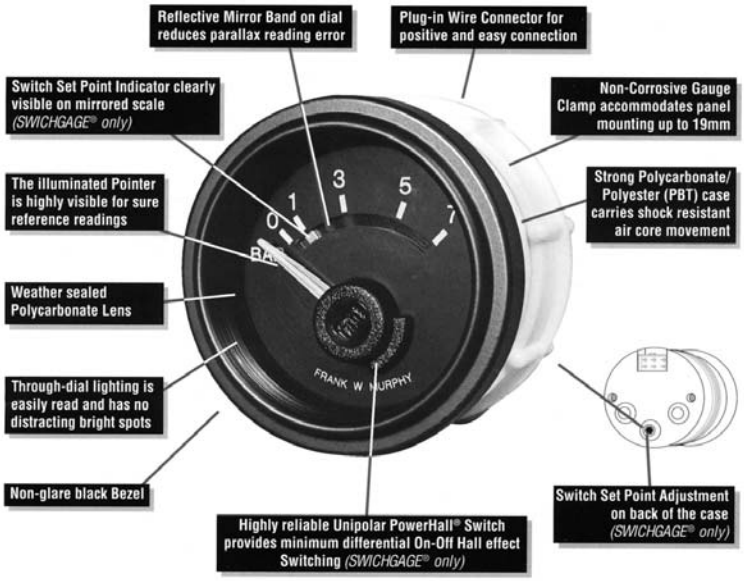
Description

The EG21 and EGS21 series take the electric gauge to new heights, with leading-edge technology and proven reliability. With our proven HG Air Core Movement design, the EG(S)21 series offers superior operation, reading accuracy, back-lighting and installation. The EG(S)21 gives you the assurance of highest reliability and service.

These rugged, environmentally sealed gauges exceed the rigid SAE J1810 standard for reliable operation in rough off-road and power environments. Corrosion resistant materials are used throughout, making the gauges highly suited for marine and other environmentally sensitive applications. Soft, non-glare dial and pointer illumination is provided by “cold light” LED: when powered, the white scale lettering and clear pointer become soft red. All units feature a non-glare, low profile black bezel.

The EGS21 Swichgage® has all the features of the EG21 gauge, plus an adjustable set-point PowerHall® switch output for operating alarms or equipment shutdown. The trip point is adjustable over 90% of the scale and has a set point indicator visible on the gauge face.

Key features



Warranty

A one year limited warranty on materials and workmanship is given with this Murphy product. Full details are available at **www.fwmurphy.co.uk/warranty**.

Scale options

pressure:	0 – 30 PSI / 0 – 2 Bar
	0 – 100 PSI / 0 – 7 Bar
	0 – 7 Bar
	0 – 400 PSI / 0 – 28 Bar
	0 – 28 Bar
temperature:	40 – 120°C
	60 – 150°C
fuel level:	E (empty) – ¼ - ½ - ¾ - F (full)
DC ammeter:	–60 / 0 / +60 Amps (internal shunt)
DC voltmeter, 12V:	8 – 18 Volts
24V:	16 – 36 Volts

PowerHall® is a registered trademark of Allegro MicroSystems Inc.

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FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

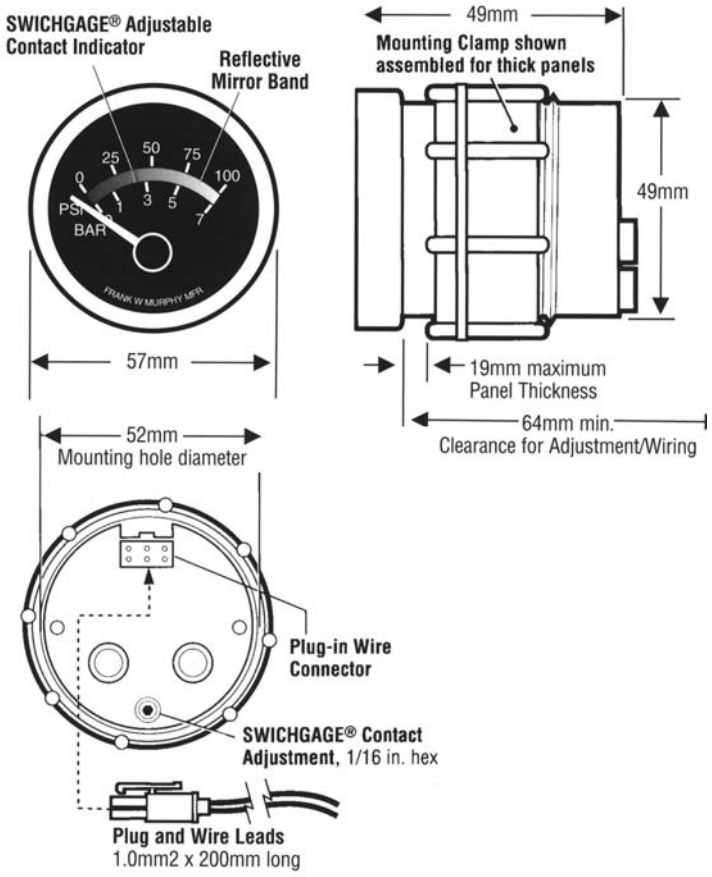
MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

Specifications

gauge:	
movement	air core, silicon dampened pointer
scale	black background; white markings and clear pointer (red when illuminated)
Swichgage® setting (EGS only)	red bar visible on mirror band, adjusted from gauge rear (1/16 in. hex type Allenkey).
electrical:	
supply voltage, VDC	10 – 16V (12V units), 20 – 32V (24V units)
overvolts protection	200% of nominal for 5 mins, to SAE J1810 (excludes EGS Powerhall® switch output)
reverse DC protection	100% reverse DC polarity, continuous
Swichgage® output (EGS only)	Powerhall® effect switch, normally open, closing to battery negative (pressure, fuel and volts set on on decreasing scale; temp. and amps set on increasing scale). Rated 300mA continuous.
connection	plug connector and wire leads (supplied), 18AWG (1.0mm^2) x 200mm
physical:	
case	polycarbonate/polyester (PBT), impact and weather resistant with screw-on mounting clamp
lens	clear polycarbonate, UV stabilised
bezel	matt black, non-glare
operating temperature	–40 to +85°C (–40 to 185°F)
storage temperature	–60 to +85°C (–77 to 185°F)
weight	approx. 100 – 150g (including harness)
environment and test	to SAE J1810. All models are CE marked.

Dimensions



How to order

Gauges/Swichgages *(N.B. all part numbers include connector plug and 200mm wiring harness)*

	EG21, 12V	EG21, 24V	EGS21,12V	EGS21,24V
Pressure				
0 - 30 PSI / 0 - 2 bar	05.70.2322	05.70.2323	05.70.2336	05.70.2337
0 - 100 PSI / 0 - 7 bar	05.70.2326	05.70.2327	05.70.2340	05.70.2341
0 - 7 bar	05.70.2328	05.70.2329	05.70.2342	05.70.2343
0 - 400 PSI / 0 - 28 bar	05.70.2332	05.70.2333	05.70.2346	05.70.2347
0 - 28 bar	05.70.2334	05.70.2335	05.70.2348	05.70.2349
Temperature				
40 - 120°C	10.70.1310	10.70.1311	10.70.1312	10.70.1313
60 - 150°C	10.70.1314	10.70.1315	10.70.1316	10.70.1317
Other				
Fuel level: E - ¼ - ½ - ¾ - F	15.70.0512	15.70.0513	15.70.0514	15.70.0515
DC volts: 8 - 18V, 16 - 36V	65.70.0130	65.70.0131	65.70.0132	65.70.0133
DC amps: –60 / 0 / +60 A	65.70.0134	65.70.0140	65.70.0135	65.70.0139

Resistive senders

Range	Thread §	2 wire (insulated return)	2 wire (insulated return, drives 2 gauges)	1 wire (earth return)
Pressure				
30 PSI / 2 bar §	1/8" NPT	00.00.3039	n/a	n/a
100 PSI / 7 bar §	1/8" NPT	00.00.3042	00.00.3055	00.00.3029
100 PSI / 7 bar	M10 x 1.0	n/a	n/a	00.00.4570
400 PSI / 28 bar §	1/8" NPT	B1078	n/a	n/a
Temperature §				
120/150°C (250/300F)	1/2" NPT	10.09.0050*	10.09.0066*	00.00.3034
120/150°C (250/300F)§	5/8" UNF	10.09.0051*	10.09.0065*	00.00.3088
120/150°C (250/300F)	1/8" NPT	10.09.0069*	10.09.0067*	00.00.3084
Fuel				
Tank depth 150 – 600mm		00.00.3037	00.00.3050	00.00.3024

§ See tables right for thread adaptors, available separately for use with standard senders
** These part numbers include a rubber dust boot*

Sender thread adaptors

For use with 1/8" NPT pressure senders:-

M14 x 1.5	65.12.120

For use with 5/8" UNF temperature senders:-

1/2" NPT	10.05.0131
3/4" NPT	10.05.0105
1/4" NPT	10.05.0167
3/8" NPT	10.05.0069
5/8" UNF	10.00.2452
3/8" BSPT	10.05.0284
1/2" BSPT	10.05.0330
M14 x 1.5	10.00.2442
M16 x 1.5	10.00.2444
M18 x 1.5	10.00.2443
M20 x 1.5	10.00.2446
M22 x 1.5	10.00.2445
M24 x 1.5	10.00.2449

CANdrive™
CANbus J1939 to electric gauge interface

ys6399
22 May 2006
catalogue section 78

- **Compatible with SAE J1939 CANbus engine data**
- **Drives standard electric gauges**
- **Selectable compatibility with Murphy or other gauge types**
- **Engine fault LED option**

Description

Murphy CANdrive™ modules offer a low-cost instrument solution for modern electronic engines. CANdrive™ acts as an interface between ECU CANbus/J1939 transmitted data and standard electric indicating gauges. The CANdrive™ interface and electric gauges are a cost-effective alternative to J1939-compatible displays and gauges, or to retrofitting of engine senders, magnetic pickups and wiring.

CANdrive™ has three outputs: on standard versions, the outputs drive engine tachometer, oil pressure and coolant temperature gauges. Selectable circuit board links allow compatibility with Murphy, VDO or Datcon electric gauges. For volume orders, the outputs can be custom-configured to drive other gauge types or remote lamps/relays.

CANdrive™ is packaged in a compact, surface mounted case with epoxy encapsulation for maximum durability and environmental sealing. Electrical connection is via a 12-way automotive-type connector.

Warranty

A two year limited warranty on materials and workmanship is given with this product. Full details are available at **www.fwmurphy.co.uk/warranty**

How to order

Stock code	*Model / description*
79.70.0001	**CDV100F**, CANdrive™ J1939 to gauge interface, 1 x CAN status LED, connector forward
79.70.0002	**CDV300R**, CANdrive™ J1939 to gauge interface, 8 x status/fault LEDs, connector rearward
79.70.1003	**CDVG**, optional sealing gasket for CDV300R

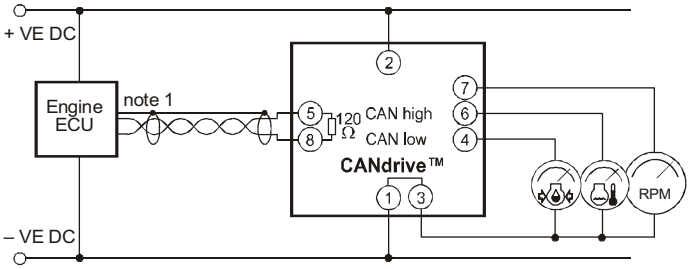
Further information:-

Document	***Description***
ys6347	EG(S)21 series electric gauges
TAH-97026B	AT series tachometers

Product specifications

power supply:	
operating voltage:	
12V range (link L2 in place)	7 – 16 VDC
24V range (link L2 cut)	19 to 30 VDC
current consumption	CDV100: 25mA typ. CDV300: 50mA typ. (2 LEDs lit)
inputs:	
CANbus	SAE J1939 protocol. Input has an 120 Ohm terminating resistor, removable by cutting link.
outputs:	*(all ratings non-reactive)*
oil pressure gauge, coolant temperature gauge	link selectable for Murphy, VDO or Datcon electric gauges
tachometer	pulsed DC, approx. 121 Hz. @ 1500 RPM
general:	
overall dimensions (w x h x d)	case: 68 x 96 x 22 mm (allow 50mm depth with connector)
weight	approx. 80 g
environmental sealing	IP60 CDV300R: IP65 from front with optional CDVG gasket
operating ambient temperature	–20°C to +85°C

Typical connection



Notes:-
1. ECU CANbus screen is typically earthed at one end only. Check ECU documentation for for details

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS & SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

INDUSTRIAL PANEL DIVISION
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

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FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

Keystart 7210 & 9610 series
Engine and Generator Controls

ys6378
29th July 2005
catalogue section 75

- **Manual start/stop**
- **Keyswitch operation**
- **Timed preheat output**
- **Automatic fault shutdowns**
- **Overspeed shutdown, magnetic pickup or generator AC driven**
- **72mm or 96mm DIN case**

Description

Keystart 7210 and 9610 series controls provide manual start/stop and automatic fault protection for generators, pumps and other engine-driven applications. The units are available in two sizes: the 7210 series uses a DIN 72mm case (for 68 x 68mm panel cut-outs); 9610 series units have a DIN 96mm case (for 92 x 92 mm cut-outs).

Operator control is by a 3 position keyswitch on the front facia - see overleaf for operation details. The key is common to all Keystarts and removable only in the Stop/Reset (O) position. Outputs are provided for the control of engine fuel (energised to run), starter motor and preheat. The Keystart also has an alarm output for remote/audible warning of faults.

The front facia has six LED and pictograms for indication of engine status and faults - details overleaf. Fault shutdown switch inputs (closed to negative on fault) are provided for engine low oil pressure, high engine temperature and auxiliary/plant fault. Models 7211 and 9611 have a fully adjustable engine overspeed shutdown, driven by generator AC or magnetic pickup. Charge alternator excitation and a charge fail warning LED are fitted as standard.

Electrical connection is by spring-clamp terminal blocks at the rear. The Keystart has a universal 7 to 30VDC power supply, allowing operation with 12 or 24VDC engine batteries. Engine cranking brown-out protection is fitted as standard.

Warranty

A two year limited warranty on materials and workmanship is given with this product. Full details are available at **www.fwmurphy.co.uk/warranty**

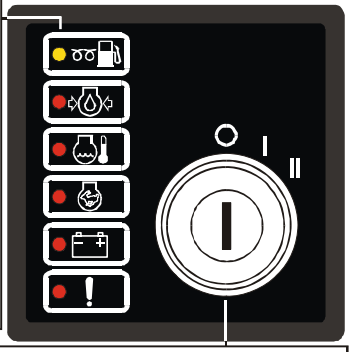
Product specifications

power supply:	
operating voltage:	
steady state	7 – 30 VDC
brown out / cranking	5 VDC
current consumption	< 100mA
inputs:	
fault switch inputs:	close to negative DC during fault
–ve input defined as:	*–1V to +1V w.r.t. – ve DC supply*
speed sensing inputs:-	
generator AC	70 – 270 VAC rms, < 50 to > 60 Hz., default setting: 50Hz
mag pickup/transducer	10 – 60 VAC peak, < 2000 to > 6500 Hz. default setting: 3000Hz
outputs:	*(all ratings non-reactive)*
run, preheat	positive DC, switched NO relay contact, 7210 series: 1 A max. @ 24V DC 9610 series: 16 A max. @ 24 V DC
start (crank)	positive DC via keyswitch contacts, 16 A max. @ 24V DC
alarm (fault)	negative DC (open collector NPN transistor), 100mA max.
calibration/tacho	to suit 0 – 1 mA, 75 Ohm meter output = 0.75mA at rated engine speed
adjustable settings:	
preheat timer	0 to 20 secs, default setting 0 secs
fault override timer	2 to 20 secs, default setting 10 secs
overspeed trip level	100 to 130 % of calibrated speed, default setting 110%
general:	
overall dimensions (w x h x d)	72 x 72 x 100 mm (7210 series) 96 x 96 x 131 mm (9610 series)
panel cut-out size	DIN 68 x 68 mm (7210 series) DIN 92 x 92 mm (9610 series)
weight	approx 300 g
operating ambient temperature	–10°C to +55°C

Front facia and operation

LED indication:-

- preheat on - amber
- run (fuel on) - green
- low oil pressure fault shutdown - red
- high engine temperature fault shutdown - red
- overspeed/plant fail 2 fault shutdown - red
- charge fail warning - red
- plant fail 1 shutdown - red



3 position keyswitch:

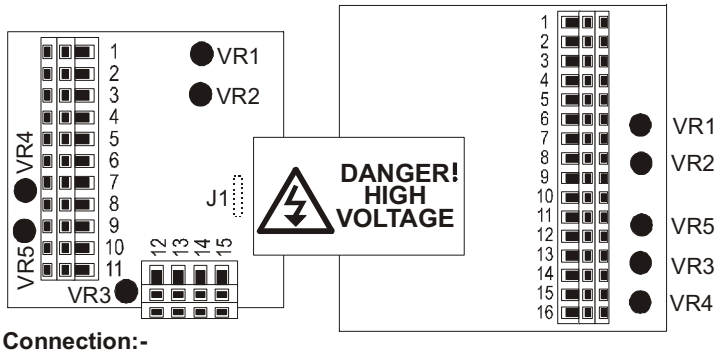
◯ **Off/Reset**. Removes power, stops the engine and resets any latched shutdown fault.

| **Run.** Activates the timed Preheat output (if enabled), followed by activation of the Fuel relay. The fault 'override' timer begins as soon as the Run relay activates. Once the engine is fully running, Keystart monitors for faults and shuts down the engine if a fault is detected.

|| **Start/crank**. Maintains the FUEL output, and activates the START output. Shutdown fault inputs are disabled and the fault override timer is reset. This position spring-returns to I (Run) on release.

Rear facia, connection and settings

721x series **961x series**



Connection:-

1 Alarm output: –ve DC
2 Fuel output: +ve DC
3 Preheat output: +ve DC
4 Start (crank) output: +ve DC
5 +ve DC power supply
6 –ve DC power supply/pickup
7 Plant fail 1 input
8 Oil pressure fault input
9 Engine temp fault input
10 Charge fail (WL)
11 Tacho/calibration output +ve
12 Tacho/calibration output –ve
13 L] Gen. AC (7211/9611 only)
14 N] 70 - 270 VAC, 50/60Hz
15 Plant fail 2 input (7210/9610) or Mag. pickup input (7211/9611)
16 Aux (run) input: +ve DC (961x only)

Adjustment *(use a 3mm flat head screwdriver)*

All units:-
VR1: Preheat, 0 - 20 secs, clockwise to increase.
VR2: Fault override, 2 - 20 secs, clockwise to increase.

Overspeed (7211/9611) units only:-
VR3: Overspeed, 100 - 130% of VR4/5, clockwise to increase.
VR4: Generator AC] Speed calibration. Set link J1. Run engine.
VR5: Mag. pickup] Adjust pot. to give tacho output of 0.75mA.

How to order

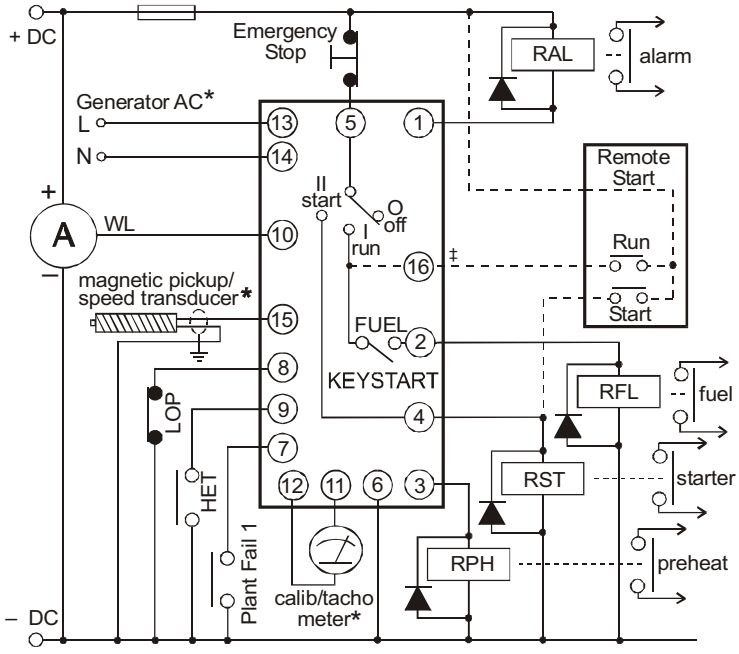
Stock code	*Model / description*
76.70.1166	KEY7210, 72mm Keystart, no overspeed
76.70.1167	KEY7211, 72mm Keystart, AC/MPU overspeed*
76.70.1168	KEY9610, 96mm Keystart, no overspeed
76.70.1169	KEY9611, 96mm Keystart, AC/MPU overspeed*

** Note: stock units are set to AC sensing, nominal 50Hz. To select magnetic pickup sensing, adjust internal circuit board link J1.*

Further information

Document	*Description*
yi6379	Keystart 7210/9610 installation instructions

Typical connection



Notes:-

* Overspeed models 7211/9611 only. Selection of generator AC or magnetic pickup speed sensing is by internal circuit board link J1. Stock units are set for generator AC sensing, 50Hz nominal. On non-overspeed models, pin 15 is 'plant fail 2' switch input, with connection as pin 7.

‡ Pin 16 (remote run input) available only on models 9610/9611.

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS & SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

INDUSTRIAL PANEL DIVISION
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

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FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

Autostart 700

Automatic Generator Controller

ms5893
revision B, 5th July 2004
catalogue section 75

The proven industry standard for over 10 years, the Autostart 700 provides fully automatic start up, load transfer, fault monitoring and shutdown of a stand-by diesel generator.

Key features

- Keyswitch selectable operating mode:–
  Auto, Test/Manual, Lamp Test or Off/Reset
- 96 x 96mm DIN standard, front panel mounted case
- 7 fault/status LED indicators:–
  mains fail, start fail, overspeed, low oil pressure, high engine temperature, charge fail, plant fail
- Switchable 12 or 24 V DC power supply
- Magnetic pickup or AC alternator speed sensing
- Fully adjustable timer and control options

Operation

The 4 position, front facia keyswitch is used to select Autostart's operating mode. Green and red LEDs around the switch indicate the selection of Auto or Test (manual) modes. The key is common to all units and is removable in the Off and Auto positions only.

Off/reset

Removes all power from the unit and resets all alarms.

Lamp test

Lights all LEDs and activates a lamp test output. Operation otherwise as for Auto mode.

Auto mode

When Autostart and the generator are required to be on standby, positive DC must be applied to the mains failure terminal (pin 23).

When a mains failure occurs, power is removed from pin 23 and Autostart waits for a user adjustable 'start delay'. If mains is restored in this period, the timer resets and the system returns to standby.

If the mains supply remains failed, Autostart initiates an automatic start sequence, consisting of up to 9 engine crank/rest attempts, with each crank/rest 'pulse' period adjustable to give a maximum of 0.5 to 30 seconds.

If a successful engine start is detected (engine speed above 40%), Autostart disengages and latches out the starter motor. If Autostart does not detect that the engine is running after the set number of start attempts, a 'start fail' fault is signalled. Once the engine is fully running – with speed above 90%, AC voltage above 66%, and oil pressure good – Autostart attempts to load the generator by activating it's Load Relay.

A mains return is signalled by re-applying battery positive to pin 23. The generator continues to run on load until the end of the user adjustable 'change-back' delay. Autostart then takes the generator off load, but allows it to run on for an adjustable 'cool' time before stopping the engine and returning the system to standby.

Specification

Power supply:	
operating voltage:	9 – 16 V DC (12V setting) 18 – 32 V DC (24V setting) fully charged battery backup allows total loss of supply for > 1 min
current consumption	typically 200 mA
Inputs:	
generator AC input:	
operating voltage range	50 – 300 V AC rms
nominal frequency range	< 50 Hz. to > 400 Hz. at rated engine speed
magnetic pickup:	
operating voltage range	5 – 100 V AC rms
nominal frequency range	< 600 to > 6 kHz.
Outputs:	*(all ratings for resistive load)*
crank and fuel relays	+ DC (switched SPNO contact) 16A max. @ 24V DC
alarm relay	+ DC (switched SPNO contact) 5A max. @ 24V DC
load relay	volt free SPCO contacts 16A max. @ 240V AC
auto mode output	+ DC (switched), 250mA max.
lamp test	+ DC or – DC (switch selectable), 250mA max.
tachometer/calibration	To suit moving coil meter 0 – 1mA fsd, 75 Ω coil. Output at rated speed = 0.75 mA
Adjustable settings:	*(all settings approximate)*
start delay	1 to 60 seconds
change-back delay	1 to 60 minutes
cool delay	0.2 to 5 minutes
crank pulse/dwell	0.5 to 30 seconds
override time	0.5 to 30 seconds
overspeed trip level	100 – 120% of calibrated speed
Physical:	
overall dimensions (W x H x D)	96 x 96 x 150 mm
panel cut-out size	DIN standard 92 x 92 mm
weight	approx. 700 g
operating ambient temperature	–10 to +55 °C

If the mains fails again during the 'change-back' or 'cool' delays, both these timers reset and Autostart either maintains or re-applies the generator load.

Test mode

Autostart may be configured to give an immediate, automatic engine start when Test mode is selected. Alternatively, operator controlled starting and stopping can be achieved using remote panel push buttons.

In test mode, the generator will run indefinitely until the key is switched to Off/reset (causing the generator to stop) or to Auto mode (Autostart goes through controlled 'change-back' and/or 'cool' times before shutting down the engine).

Autostart may be set to allow or inhibit the loading of the generator if the mains should fail while the engine is running in Test mode.

Fault protection and alarm system

Autostart's engine fault protection and alarms operate in both Auto and Test modes. 7 LEDs on the front facia give indication of generator faults and mains status.

Dedicated inputs are provided for use with low oil pressure (LOP) and high engine temperature (HET) fault switches. Top facia switches allow set-up for use with fault switches that open or close during fault, with wiring to positive or negative DC. These inputs are inhibited while the engine is at rest, during starting and until the end of the override time (adjustable up to 30 seconds). After that time, a LOP or HET fault causes an immediate engine shutdown.

An overspeed condition, measured through the generator AC or magnetic pickup inputs, also results in an engine shutdown. This trip will operate at any time after the engine has started (it is not inhibited by the override timer). The overspeed trip level may be user set between 100% and 120% of the (calibrated) normal running speed.

A 'plant fail' fault may be activated at any time by connection of battery negative to pin 21, shutting down the engine or preventing it from starting. This fault input is non-latching.

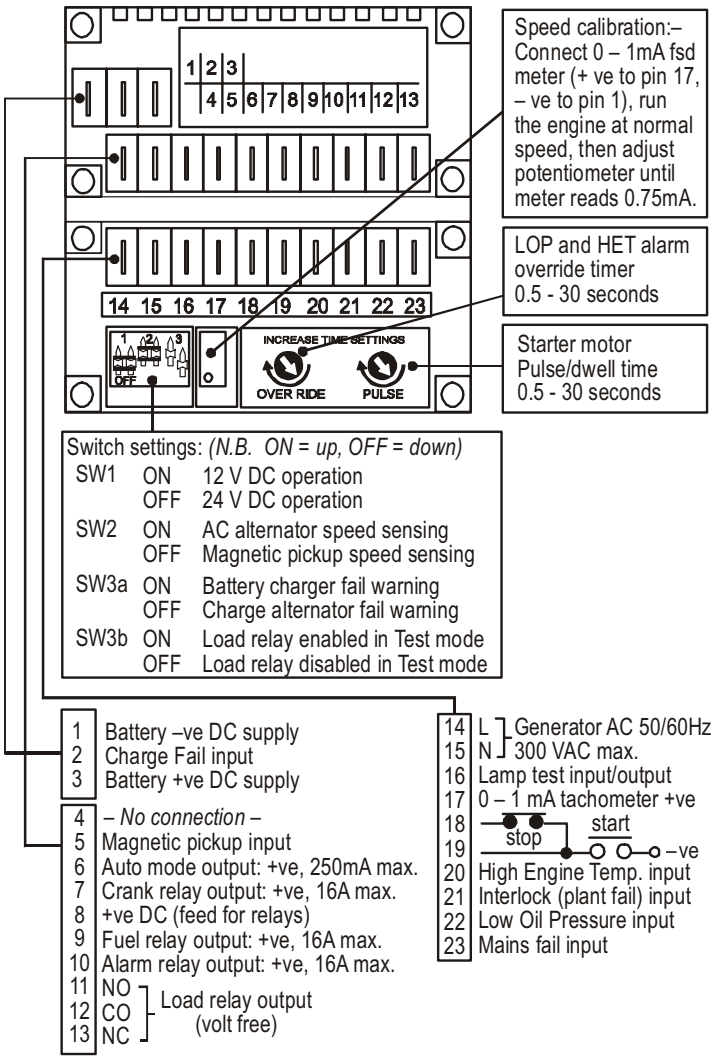
The charge fail warning LED lights (but Autostart takes no other action) when the voltage on pin 2 falls to negative DC. This input can be set to operate at any time (when using mains battery chargers) or only once the engine is running (for charge alternators).

Autostart's common 'alarm' relay operates during LOP, HET, overspeed, plant fail and start fail faults.

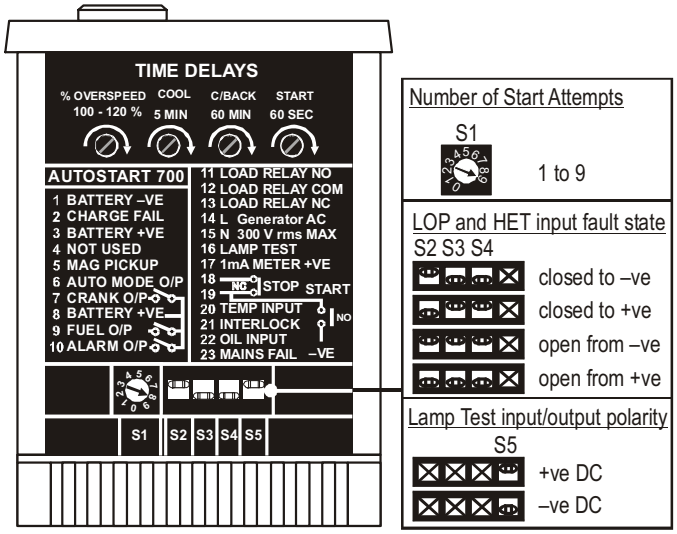
How to order

Stock code	Model	Description
76.70.0025	AS3/E230	Autostart 700, 230VAC/50Hz, standard settings
76.70.0286	AS3/E230SPCL	Autostart 700, 230VAC, customer specified settings

Rear facia settings and connection



Top facia settings



FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

Autostart AS705S
Automatic Engine/Generator Controller

ms5258
revision C, 29th July 2004
catalogue section 75

- **Automatic or manual engine and generator control**
- **LED indication of status/faults**
- **Custom LEDs and labelling**
- **Programmable timers, inputs, outputs and control options**

Description

The AS705S provides fully automatic control, fault monitoring and shutdown of a standby generator, pump or engine driven application.

Features include:-

- Automatic or manual control, keyswitch or rotary switch selectable
- Status and fault indication by 17 LEDs. 12 have preset labelling, 5 may be custom programmed and labelled.
- Wide range power supply, 5 to 40 VDC.
- Automatic, timed control of generator contactor.
- Electrical connection by two-part, screw terminal blocks.
- Tamper proof settings. Timers, I/O and control options are set using a PC serial link and free of charge software.
- Compact, front of panel mounting

Application

The Autostart series may be used in any unmanned application where automatic engine starting and stopping is required. The AS705's control, measurement and display features allow it to be used in place of multiple control units, trip relays and indicating gauges, and at a fraction of the cost.

For further details, please contact your Murphy representative, or visit **www.fwmurphy.co.uk/as7xx**

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

MURPHY®

Product specification

Power supply:	
operating voltage: steady state range	5 – 40 V DC continuous,
crank brown-out	to 0 V for <= 100 mSec
current consumption	typically 150 mA
Inputs:	
DC inputs (inputs 1 - 5, rem. start):	
positive input voltage range	80% to 100% of positive DC
negative input voltage range	-1V to +2V w.r.t. negative DC
generator AC input:	
operating voltage range	90 – 300 V AC rms single phase
frequency measurement range	0 – 99 Hz.
magnetic pickup:	
operating voltage range	7 – 80 V AC rms
frequency measurement range	0 – 10 kHz
Outputs:	*(all ratings for resistive load)*
start and fuel relays	positive DC (switched relay) 16A max. @ 24 V DC
programmable outputs 1 – 3	negative DC (semiconductor) 250mA max. @ 33 V DC
programmable output 4	negative DC (switched relay) 5A max. @ 24 V DC
programmable output 5 (default setting: common alarm)	postive DC (switched relay) 5A max. @ 24 V DC
programmable output 6 (default setting: gen. contactor)	volt free SPNO relay 5A max. @ 240 V AC
auto & manual outputs	positive DC (switch), 250 mA max.
off/reset output	negative DC, 250 mA max.
General:	
overall dimensions (W x H x D)	96 x 96 x 162 mm
panel cut-out size	DIN standard 92 x 92 mm
weight	approx. 650 g
operating ambient temperature	–10 to +55 °C

Front facia

LED indicators:-
- Preset x 10
- Programmable x 5
- Auto mode x 1
  Manual mode x 1

Custom label sheet

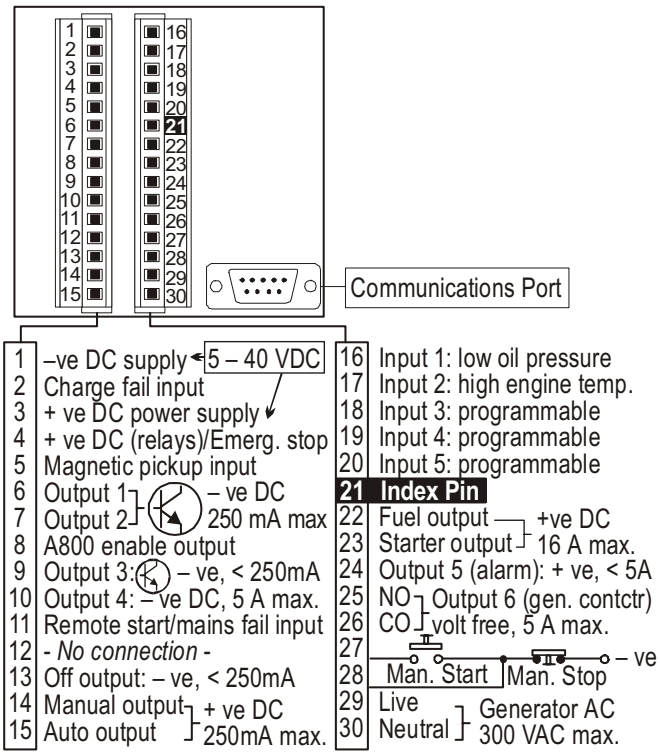
3 position operating mode switch (keyswitch shown):-

○ Off/reset

AUTO Auto

Manual

Rear facia and electrical connection



How to order

stock code	*model / description*
76.70.0065	AS705SKD, keyswitch, 230VAC
76.70.0037	AS705SRD, rotary switch, 230VAC

Programming accessories:-

76.70.0018	AS7CA, 9 to 9 way local comms lead
76.70.0019	AS7CB, 9 to 25 way local comms lead
76.70.0020	AS7CC, local comms interface
76.70.0203	AS7CK, PC program and monitor software for AS7xx series.

Also available for free of charge download from:
www.fwmurphy.co.uk/download

Program options:

The AS705 is programmed using PC software model AS7CK, available for free of charge website download. During setup, AS705 and PC are connected by local serial link (using the accessories listed left). Over 50 programmable functions allow custom set-up for your application:-

Timers: start delay, preheat, crank, crank rest, no. of start attempts, alarm override, engine warmup, speed signal, (mains AC) restoration, cooldown, (fuel) energised to stop.

Inputs: input 1 – 5 configuration (open/close/+ve/-ve); input 3 – 5 actions (shutdown, warning, indication, load release, lamp test, manual restore, test, alarm mute, load reset)

Outputs: 6 outputs, each set for one of 40 signalling and control options, e.g. preheat, energised to stop fuel, engine running, muteable alarm, individual faults, etc.

Generator: trip Hz/RPM levels and response for crank release, underspeed, overspeed, speed overshoot on start.

DC: high and low battery voltage warning, charge fail settings (charge alternator WL or battery charger), WL crank release.

LEDs: allows programming of the LED indicators (including the 5 with custom message windows).

See document mi5265 for a full list of program options. Software AS7CK also features real time monitoring and display of engine parameters – see document mi5266 for full details.

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FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

Autostart AS710S
Automatic Engine/Generator Controller

ms5259
revision B, 5th July 2004
catalogue section 75

- **Automatic or manual engine and generator control**
- **LCD display of engine and generator parameters**
- **Fully programmable**
- **Remote communication, monitoring and control**

Description

The AS710S provides fully automatic control, fault monitoring and shutdown of a standby generator, pump or engine driven application. Features include:-

- Automatic or manual control, keyswitch selectable
- 32 character, back-lit LCD, for the display of engine and generator parameters.
- Full programmability of inputs, outputs, timers, trip levels and control options (details overleaf).
- Wide range power supply, 5 to 40 VDC.
- Optional measurement and display of engine oil pressure and coolant temperature, with programmable warning and shutdown levels.
- Automatic, timed control of generator contactor.
- Electrical connection by two-part, screw terminal blocks.
- Remote communication, monitoring and control via PC software and serial link or modem.

Application

The Autostart series is intended for use in unmanned applications where automatic engine starting and stopping is required. The AS710's control, measurement and display features allow it to be used in place of multiple control units, trip relays and indicating gauges, and at a fraction of the cost.

In addition, communication hardware and free of charge PC software provide remote monitoring, control and automatic fault notification, wherever the engine or generator location.

For further details, please contact your Murphy representative, or visit **www.fwmurphy.co.uk/as7xx**

Warranty

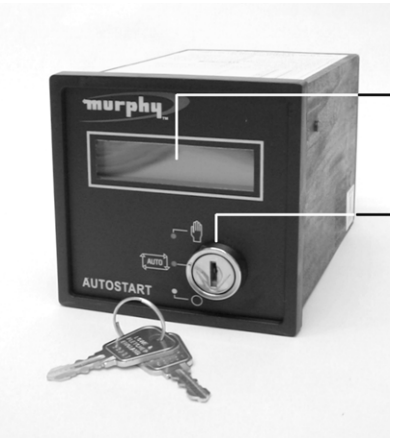
A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty.**

MURPHY®

Product specification

Power supply:	
operating voltage: steady state range	5 – 40 V DC continuous,
crank brown-out	to 0 V for <= 100 mSec
current consumption	typically 150 mA
Inputs:	
DC inputs (inputs 1 - 5, rem. start)	
input 1 (oil pressure) and	switch option (open/closed/+ve/-ve)
input 2 (engine temperature	or analogue sender option (Murphy, Datcon, VDO, BMI wired to –ve DC)
inputs 3 - 5	switch (open/closed, +ve/–ve)
generator AC input:	
operating voltage range	90 – 300 V AC rms single phase
frequency measurement range	0 – 99 Hz.
gen. frequency display accuracy	<= 2% of full scale
gen. frequency display resolution	1 Hz.
magnetic pickup:	
operating voltage range	7 – 80 V AC rms
frequency measurement range	0 – 10 kHz
engine RPM display accuracy	<= 2% of full scale
engine RPM display resolution	10 RPM
Outputs:	*(all ratings for resistive load)*
start and fuel relays	positive DC (switched relay) 16A max. @ 24 V DC
programmable outputs 1 – 3	negative DC (semiconductor) 250mA max. @ 33 V DC
programmable output 4	negative DC (switched relay) 5A max. @ 24 V DC
programmable output 5 (default setting: common alarm)	positive DC (switched relay) 5A max. @ 24 V DC
programmable output 6 (default setting: gen. contactor)	volt free SPNO relay 5A max. @ 240 V AC
auto & manual outputs	positive DC (switch), 250 mA max.
off/reset output	negative DC, 250 mA max.
General:	
overall dimensions (W x H x D)	96 x 96 x 162 mm
panel cut-out size	DIN standard 92 x 92 mm
weight	approx. 650 g
operating ambient temperature	–10 to +55 °C

Front facia

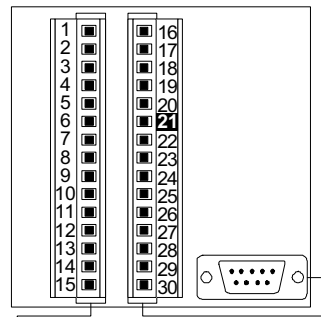


32 character, back-lit LCD

3 position operating mode keyswitch:-

- Off/stop/reset
- Auto
- Manual

Rear facia and electrical connection



1	–ve DC supply ← 5 – 40 VDC	16	Input 1: low oil pressure
2	Charge fail input	17	Input 2: high engine temp.
3	+ ve DC power supply ↓	18	Input 3: programmable
4	+ ve DC (relays)/Emerg. stop	19	Input 4: programmable
5	Magnetic pickup input	20	Input 5: programmable
6	Output 1 ┐ – ve DC	21	**Index Pin**
7	Output 2 ┘ 250 mA max	22	Fuel output ┐ +ve DC
8	A800 enable output	23	Starter output ┘ 16 A max.
9	Output 3: – ve, < 250mA	24	Output 5 (alarm): + ve, < 5A
10	Output 4: – ve DC, 5 A max.	25	NO ┐ Output 6 (gen. contctr)
11	Remote start/mains fail input	26	CO ┘ volt free, 5 A max.
12	*- No connection -*	27	
13	Off output: – ve, < 250mA	28	Man. Start / Man. Stop – ve
14	Manual output ┐ + ve DC	29	Live ┐ Generator AC
15	Auto output ┘ 250mA max.	30	Neutral ┘ 300 VAC max.

How to order

Stock code	*Model / Description*
76.70.0287	AS710SKDA, 230V/50Hz., for use with pressure/temp resistive senders
76.70.0288	AS710SKDB, 230V/50Hz., for use with pressure/temp fault switches

Optional accessories:-

76.70.0015	AS7PROG, program key-pad
76.70.0018	AS7CA, 9 to 9 way local comms lead
76.70.0019	AS7CB, 9 to 25 way local comms lead
76.70.0020	AS7CC, local comms interface
76.70.0021	AS7CD, modem comms interface
76.70.0203	AS7CK, PC comms software for AS7xx series.

Also available for free of charge download from: ***www.fwmurphy.co.uk/download***

Program options:

The AS710 may be programmed by use of a separate, removable key-pad unit (model AS7PROG), or by PC software and serial/modem communications link. Programming is restricted by a 4 figure key entry. Over 50 programmable functions allow custom set-up for your application:-

Timers: start delay, preheat, crank, crank rest, no. of start attempts, alarm override, engine warmup, speed signal, (mains AC) restoration, cooldown, (fuel) energised to stop.

Inputs: oil pressure and coolant temperature configuration: ('switch' versions - open or closed to positive or negative; resistive 'sender' versions – Murphy, VDO or Datcon). Switch inputs 3 – 5 may be set to operate with a range fault contacts (open/closed/+ve/-ve) and control options.

Outputs: 6 outputs, each set for one of 40 signalling and control options, e.g. preheat, energised to stop fuel, engine running, mutable alarm, individual faults, etc

Generator: trip Hz/RPM levels and response for crank release, underspeed, overspeed, speed overshoot on start.

DC: high and low battery voltage warning, charge fail settings (charge alternator WL or battery charger), WL crank release.

General: security settings (PINs), dial-out conditions, site name, custom power up message.

See document mi5265 for a full list of program options. Software AS7CK also features real time monitoring and display of engine parameters – see document mi5266 for full details.

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

Autostart AS731
Automatic Generator Controller

ms6127
revision A, 26th February 2003
catalogue section 75

- **Automatic or manual generator control**
- **Fully configurable timers, inputs and outputs**
- **Remote monitoring and control software, PC/Windows® compatible**

Description

The AS731 provides fully automatic control, fault monitoring and shutdown of a standby diesel generator.

Features include:-

- Automatic or manual control
- 32 character, back-lit LCD displays engine and generator parameters
- Full configurability of inputs, outputs, timers, trip levels and control options (details overleaf).
- Monitoring, display and programmable fault limits for 3 phase generator voltage, frequency and current.
- Monitoring, display and programmable warning/shutdown levels for engine oil pressure and temperature.
- Timed generator contactor control
- Remote communications, with software for PC/Windows®

Application

The AS731 is a 'full function' controller, designed for use in unmanned, standby diesel generator applications. The comprehensive control, measurement and display features allow this unit to be used in place of multiple control units, trip units and indicating gauges, and at a fraction of the cost.

The RS232 communication port and free of charge Windows® compatible software provide remote monitoring, control and automatic fault notification, wherever the generator location.

For further details, visit **www.fwmurphy.co.uk/as731**

Warranty

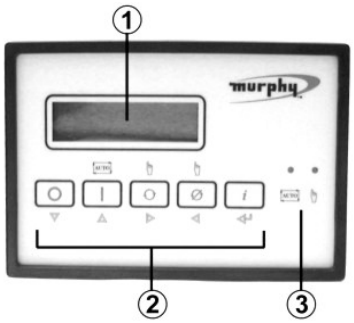
A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

Windows® is a registered trademark of Microsoft Corporation

Product specification

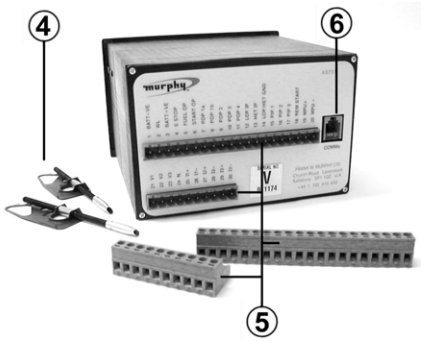
Power supply:	
operating voltage: steady state range	5 – 40 V DC continuous
crank brown-out	to 0 V for >=100mS
current consumption: standby (typ)	95mA @ 12V, 55mA @ 24V
cranking (typ)	280mA @ 12V, 170mA @ 24V
Inputs:	
DC inputs:-	
inputs 1 (oil pressure) and 2 (engine temperature)	switch (open or closed) or analogue (Murphy, Datcon, VDO 5 or 7 bar), wired to negative DC
inputs 3 – 5	open or closed to negative DC
generator AC (1, 2 or 3 phase):-	
voltage range	90–300 VAC rms L–N
voltage display resolution	1 VAC
frequency measurement range	0 – 99 Hz.
frequency display accuracy	<= 2% of full scale
frequency display resolution	1 Hz.
magnetic pickup:	
voltage range	2.5 – 25 V AC rms
frequency measurement range	0 – 10 kHz.
engine RPM display accuracy	<= 2% of full scale
engine RPM display resolution	10 RPM
AC current sensing inputs:	
operating range	designed for use with 5 Amp CT's primary ratings 10 to 5000 Amps
Outputs:	*(all ratings for resistive load)*
start and fuel relays	positive DC (switched relay) combined rating 16 A max @ 24VDC
programmable output 1 (default setting: Gen. Contactor)	volt free SPNO relay 5 A max. @ 240 V AC
programmable outputs 2 – 4	negative DC (semiconductor) 500 mA max. @ 33 V DC
Physical:	
overall dimensions (W x H x D)	144 x 96 x 162 mm
panel cut-out size (W x H)	DIN standard 140 x 92 mm
weight	approx. 770 g
operating ambient temperature	–10 to +55 °C

Front facia



1) 2 line x 16 character backlit liquid crystal display
2) Operator control keys:-
   - Off/stop/reset
   - On/Auto mode
   - Manual mode start
   - Manual mode stop
   - Info (scroll display)
3) Auto/manual mode LED indication

Rear facia

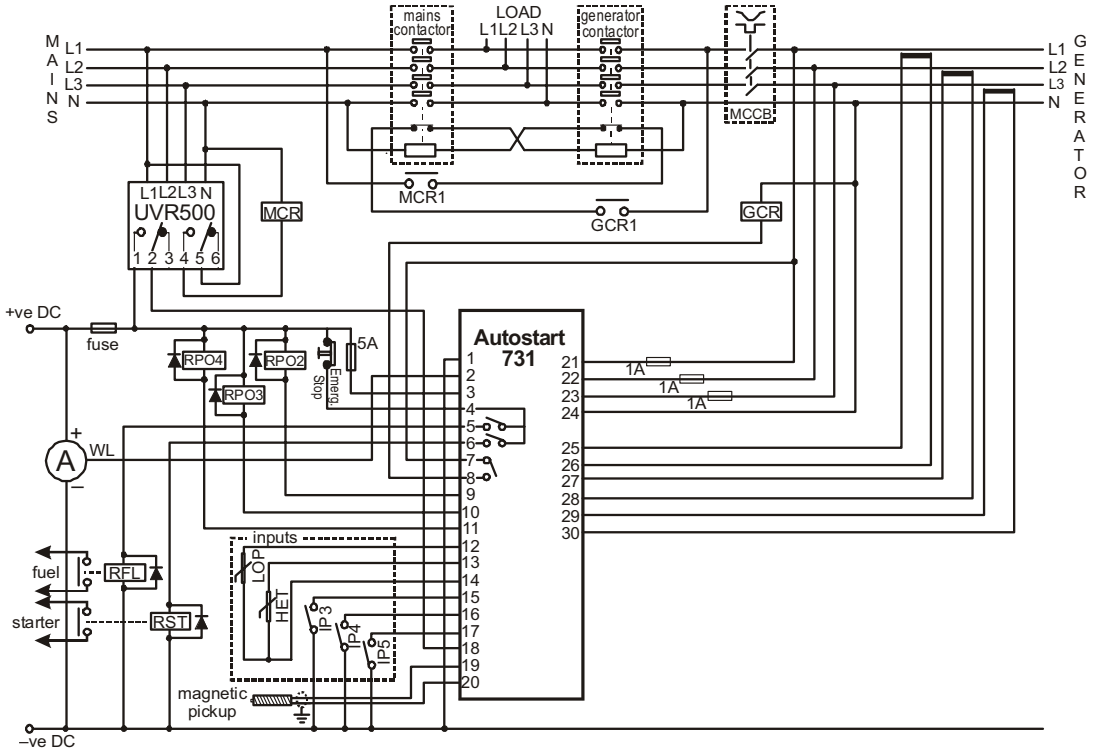


4) Mounting clamps
5) 2 x two part, screw terminal blocks, 1 – 20 and 21 - 30
6) RS232 communication port (RJ11 connector)

Electrical connection

1	Battery / DC negative supply
2	Charge fail / WL
3	Battery / DC positive supply
4	Emergency stop (positive input for fuel/starter outputs)
5	Fuel output (positive DC)
6	Start output (positive DC)
7	Output 1a (volt free relay contacts)
8	Output 1b (volt free relay contacts)
9	Output 2 (negative DC, semiconductor)
10	Output 3 (negative DC, semiconductor)
11	Output 4 (negative DC, semiconductor)
12	Input 1: oil pressure (sender or switch, to negative DC)
13	Input 2: engine temp. (sender or switch, to negative DC)
14	Input 1/2 return/ground
15	Input 3 (switch, close to / open from negative DC)
16	Input 4 (switch, close to / open from negative DC)
17	Input 5 (switch, close to / open from negative DC)
18	Remote start input (open from / close to positive DC)
19	Magnetic pickup + / high
20	Magnetic pickup – / low
21	Generator AC V1
22	Generator AC V2
23	Generator AC V3
24	Generator AC N
25	Generator current (5A CT) I1+
26	Generator current (5A CT) I1–
27	Generator current (5A CT) I2+
28	Generator current (5A CT) I2–
29	Generator current (5A CT) I3+
30	Generator current (5A CT) I3–

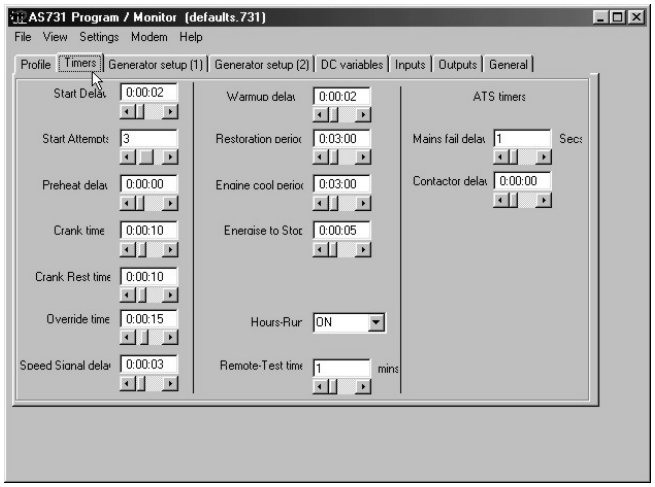
Typical connection (automatic mains fail application)



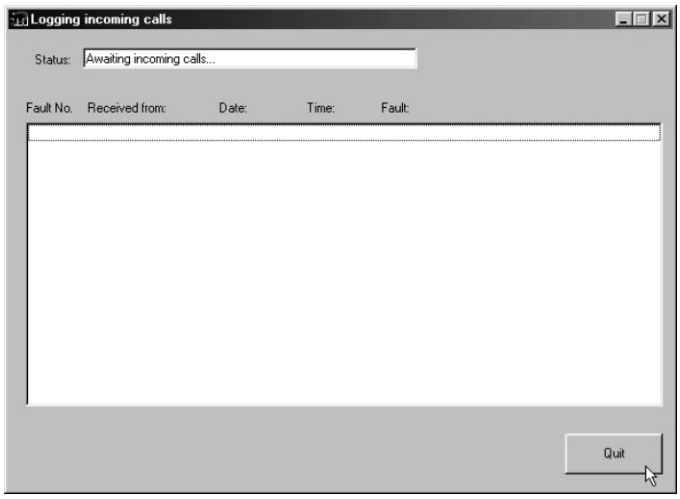
AS7CN PC software

Software model AS7CN is available free of charge from **www.fwmurphy.co.uk/download**. With a local or modem RS232 link in place between an AS731 and PC, the Windows®-based software allows the PC user to program, monitor and control the AS731. The AS731 may also be configured to dial-out to a remote PC in the event of fault conditions; the PC software may be set to receive such calls and log information about the location, date/time and type of fault.

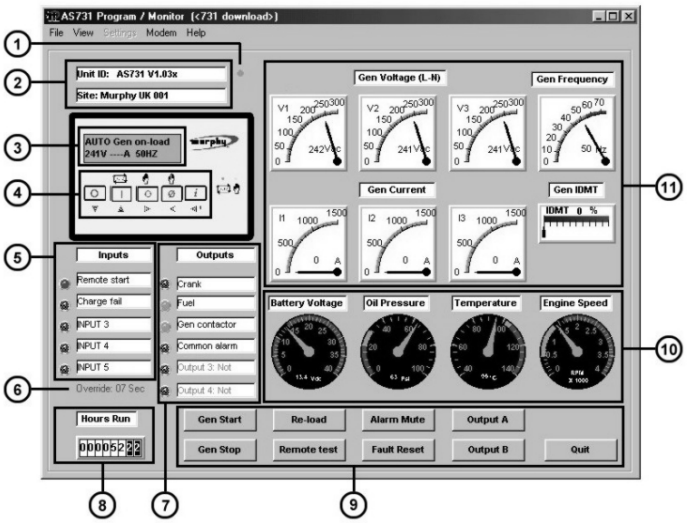
Typical program mode screen:-
(see 'program options' below for full listing)



Typical fault notification screen:-



Typical monitoring screen (single genset detail):-



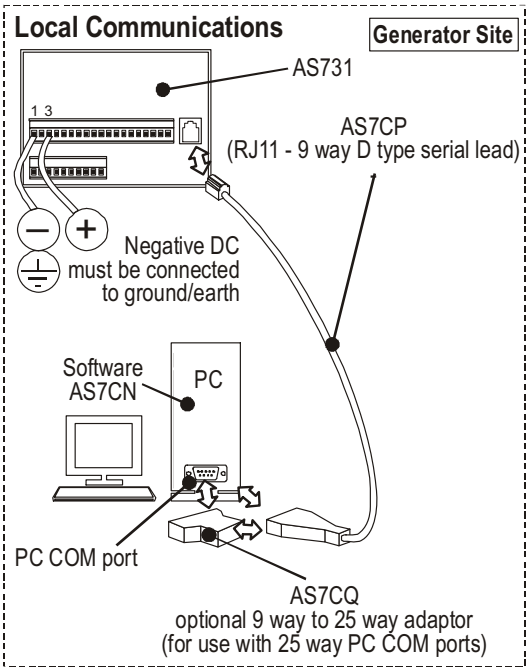
1. Communication status (flashes during RS232 activity)
2. Type, build level and name of connected unit
3. System status (mimics local AS731 display)
4. Remote operator controls
5. Input functions and status
6. Override timer status
7. Output functions and status
8. Hours run counter
9. Remote operator controls
10. Gauges for DC volts, engine RPM, oil pressure and coolant temperature
11. Gauges for generator AC volts, amps, Hz, also overcurrent IDMT trip response

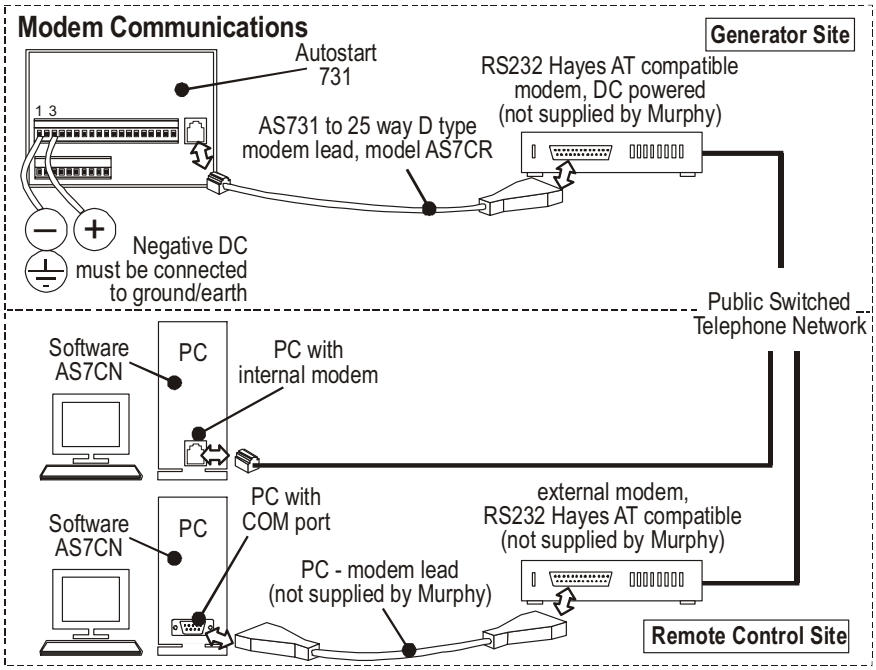
Program options

The AS731 has over 70 firmware configurable functions, allowing complete flexibility of inputs, outputs, timers and engine/generator control options - full details are available in document mi6128. Configuration is carried out using the front facia keys and LCD, or by software AS7CN and RS232 link.

Timers:	Start delay; crank time; crank rest time; number of start attempts; alarm override (on start); speed signal/overshoot delay; engine warm-up delay; (mains) restore delay; engine cool time; energised to stop time; remote test run time.
Battery DC	Low and high battery volts warning; charge alternator fail voltage; charge start (auto start on low battery) voltage; charge start run period.
Generator AC	1/2/3 phase selection; over/under voltage levels; under voltage response; over/under speed/frequency levels; under speed/freq. response. Over current settings: full load current; CT ratio; IDMT response constant; warning/shutdown response.
Inputs	2 x analog/switch inputs, 1 (oil pressure) and 2 (engine temp): sender/switch type; display units; warning and shutdown levels. 3 x switch inputs: open/closed to activate; input 'action' (15 options including shutdown fault, warning fault, load release, test, start, stop, manual restore, etc); custom fault messages.
Outputs	4 outputs, each with 50+ control or fault signalling options.
General	Access ID codes; unit/site ID; custom power up message.

AS731 RS232 communication





How to order

Stock no.	*Model/description*
76.70.0271	AS731 generator controller

Optional communication accessories:-

76.70.0310	AS7CP local communication (null modem) lead, for use with 9 way PC COM ports
76.70.0312	AS7CQ adapter for above, for use with 25 way PC COM ports
76.70.0311	AS7CR modem (remote) communication lead (RJ11 to 25 way D type)

Software model AS7CN is available for free of charge download from our web site: **www.fwmurphy.co.uk/download**

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

Further information

Doc. ref.	*Title*
ms6343	**NEW!** AS732 bulletin. *All the features of the AS731 plus RS485 MODBUS network for remote interfacing and multi-genset communication.*
mi6128	AS731/732 installation A: fitting and connection
mi6129	AS731/732 installation B: programming
mi6243	AS731/732 installation C: AS730 to AS731/AS732 retrofitting
mi6130	AS731/732 operation
mi6131	AS731/732 and PC software model AS7CN

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

ms6343
revision A, 1st July 2003
catalogue section 75

Autostart AS732
Automatic Generator Controller

- **Single or multi-genset, automatic or manual control**
- **RS485 MODBUS communication**
- **Remote monitoring and control software, Windows® compatible**

Description

The AS732 is a full-featured, programmable controller for use with single or multiple generator systems. The module provides automatic or manual genset control and load switching engine and AC fault warning and shutdown protection, plus RS232 and RS485 MODBUS RTU communications.

Other standard features include:-

- 32 character, back-lit LCD displays engine and generator parameters
- Full programmability of inputs, outputs, timers, trip levels and control options (details overleaf).
- Monitoring, display and programmable fault limits for 1, 2 or 3 phase generator voltage, frequency and current.
- Display of engine oil pressure and temperature, with programmable warning and shutdown levels.
- Free of charge remote communications software for PC/Windows®

Application

The AS732 is designed for use with unmanned, standby or base-load diesel generator applications. The comprehensive control, measurement and display features allow this unit to be used in place (and at a fraction of the cost) of multiple control units, trip units and indicating gauges.

RS232 communications and Murphy PC software provide remote monitoring, control and fault notification. The RS485 MODBUS RTU interface provides for multi-genset control systems and seamless integration with PLC, SCADA or building management systems.

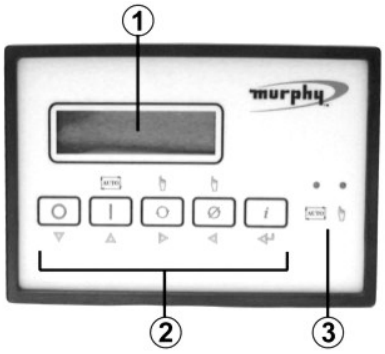
Windows® is a registered trademark of Microsoft Corporation

Specification

Power supply:	
operating voltage: steady state range	5 – 40 V DC continuous
crank brown-out	to 0 V for >=100mS
current consumption: standby (typ)	95mA @ 12V, 55mA @ 24V
cranking (typ)	280mA @12V, 170mA @ 24V
Inputs:	
DC inputs:-	
positive input defined as:	*80% to 100% of battery positive*
negative input defined as:	*–1V to +2V w.r.t. battery negative*
inputs 1 and 2 (oil pressure an	switch (open or closed) or
engine temperature)	analogue (Murphy, Datcon, VDO 5 or 7 bar), wired to negative DC
inputs 3 – 5	open or closed to negative DC
generator AC:-	
operating voltage range	3 phase, 90-300 VAC rms L-N
gen. volts display resolution	1 VAC
gen. frequency measurement range	0 – 99 Hz.
gen. frequency display accuracy	<= 2% of full scale
gen. frequency display resolution	1 Hz.
magnetic pickup:	
operating voltage range	2.5 – 25 V AC rms
frequency measurement range	0 – 10 kHz.
engine RPM display accuracy	<= 2% of full scale
engine RPM display resolution	10 RPM
AC current sensing inputs:	
operating range	designed for use with 5 Amp CT's primary ratings 10 to 5000 Amps
Outputs:	*(all ratings for resistive load)*
start and fuel relays	positive DC (switched relay) rated 16 A max. @ 24 V DC
programmable output 1	volt free SPNO relay
(default setting: gen. contactor)	5 A max. @ 240 V AC
programmable outputs 2 – 4	negative DC (semiconductor) 500 mA max. @ 33 V DC
Communications:	
RS232 port connector	RJ11
RS232 Baud rate	9600
RS232 max. lead length	10 metres
RS485 port connector	2 x RJ45
RS485 Baud rate	9600
RS485 maximum network length	1000 metres
RS485 protocol	MODBUS RTU
Physical:	
overall dimensions (W x H x D)	144 x 96 x 162 mm
panel cut-out size (W x H)	DIN standard 140 x 92 mm
weight	approx. 770 g
operating ambient temperature	–10 to +55 °C

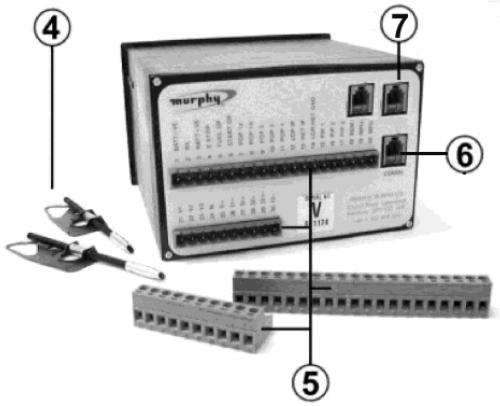
MURPHY®

Front facia



1) 2 line x 16 character backlit liquid crystal display
2) Operator control keys:-
   - Off/stop/reset
   - On/Auto mode
   - Manual mode start
   - Manual mode stop
   - Info (scroll display)
3) Auto/manual mode LED indication

Rear facia

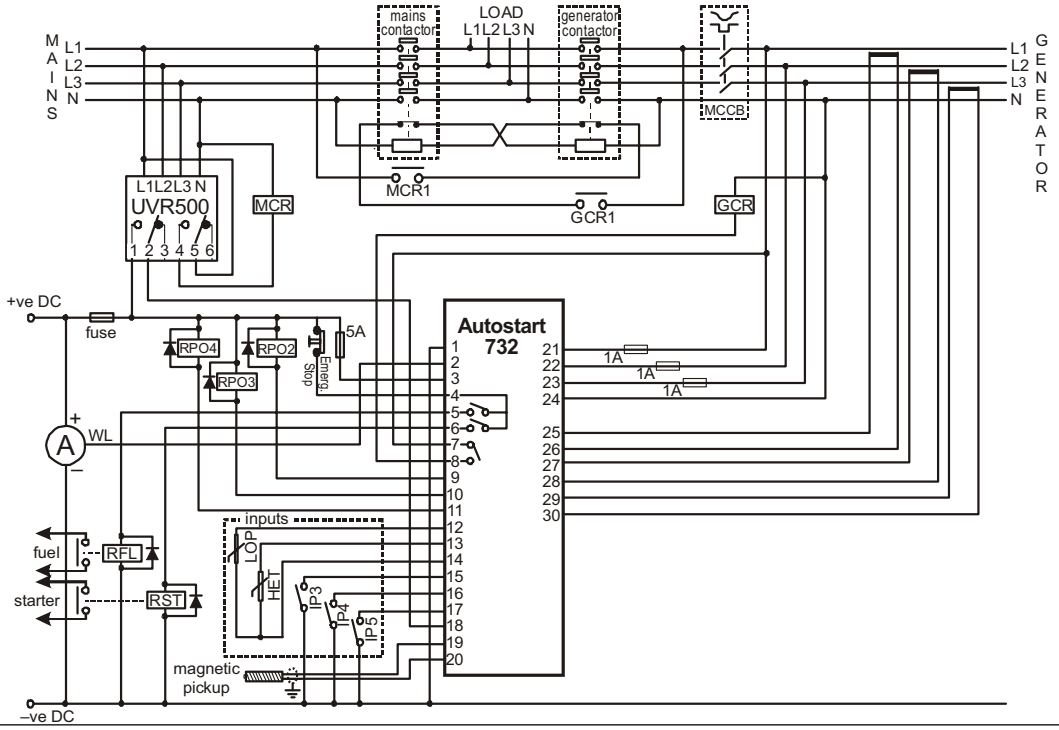


4) Mounting clamps
5) 2 x two part, screw terminal blocks, 1 – 20 and 21 - 30
6) RS232 communication port (RJ11 connector)
7) RS485 comms ports (2 x RJ45 connectors)

Electrical connection

1	Battery / DC negative supply
2	Charge fail / WL
3	Battery / DC positive supply
4	Emergency stop (positive input for fuel/starter outputs)
5	Fuel output (positive DC)
6	Start output (positive DC)
7	Output 1a (volt free relay contacts)
8	Output 1b (volt free relay contacts)
9	Output 2 (negative DC, semiconductor)
10	Output 3 (negative DC, semiconductor)
11	Output 4 (negative DC, semiconductor)
12	Input 1: oil pressure (sender or switch, to negative DC)
13	Input 2: engine temp. (sender or switch, to negative DC)
14	Input 1/2 return/ground
15	Input 3 (switch, close to / open from negative DC)
16	Input 4 (switch, close to / open from negative DC)
17	Input 5 (switch, close to / open from negative DC)
18	Remote start input (open from / close to positive DC)
19	Magnetic pickup + / high
20	Magnetic pickup – / low
21	Generator AC V1
22	Generator AC V2
23	Generator AC V3
24	Generator AC N
25	Generator current (5A CT) I1+
26	Generator current (5A CT) I1–
27	Generator current (5A CT) I2+
28	Generator current (5A CT) I2–
29	Generator current (5A CT) I3+
30	Generator current (5A CT) I3–

Typical connection (single genset AMF application)

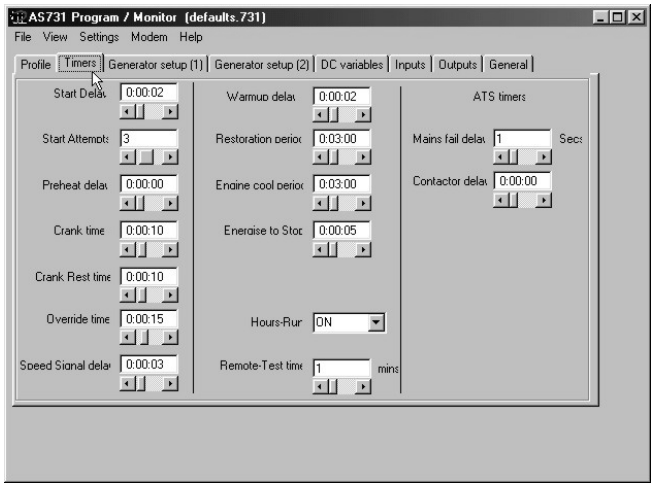


AS7CN PC software

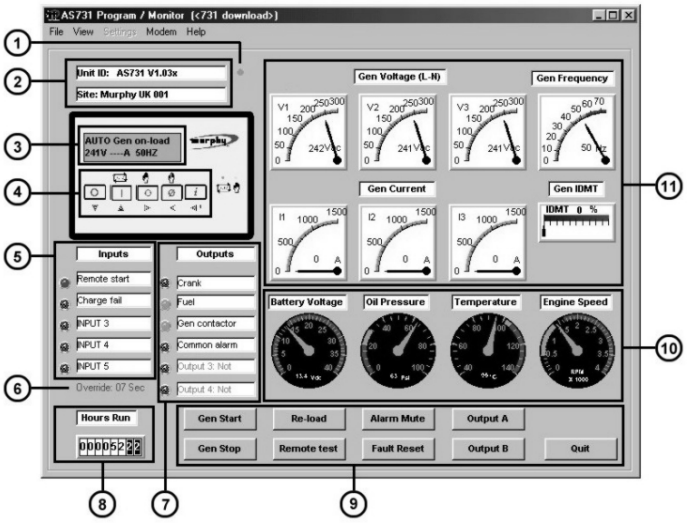
Software model AS7CN is available as free of charge from **www.fwmurphy.co.uk/download**. The software allows local or modem RS232 communication between a Windows®-based PC and an AS732 'master' controller.

Once a link has been established, the software enables remote programming, monitoring and control of the Autostart and generator. For AS732 multi-genset applications, the 'master' AS732 allows the PC operator to monitor and control any other AS732 'slave' unit connected via its RS485 network.

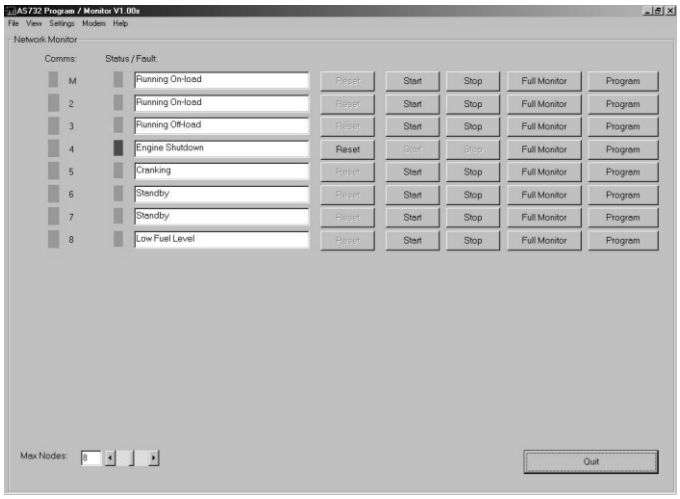
Typical program mode screen:-
(see below for full program options list)



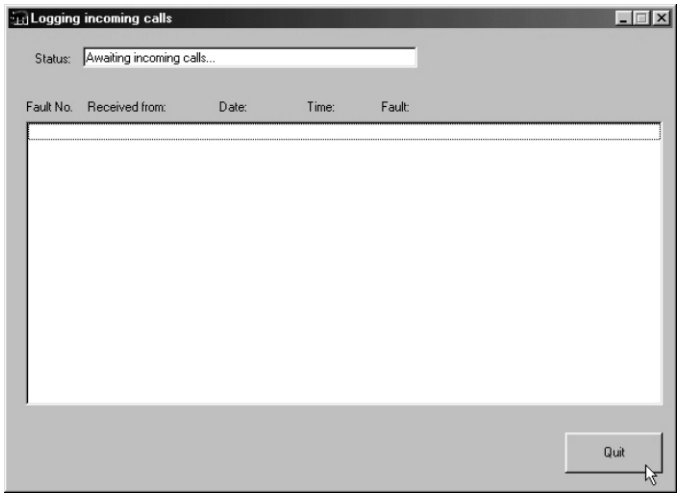
Typical monitoring screen (single genset detail):-



Typical monitoring screen (multi-genset overview):-



Typical fault notification screen:-

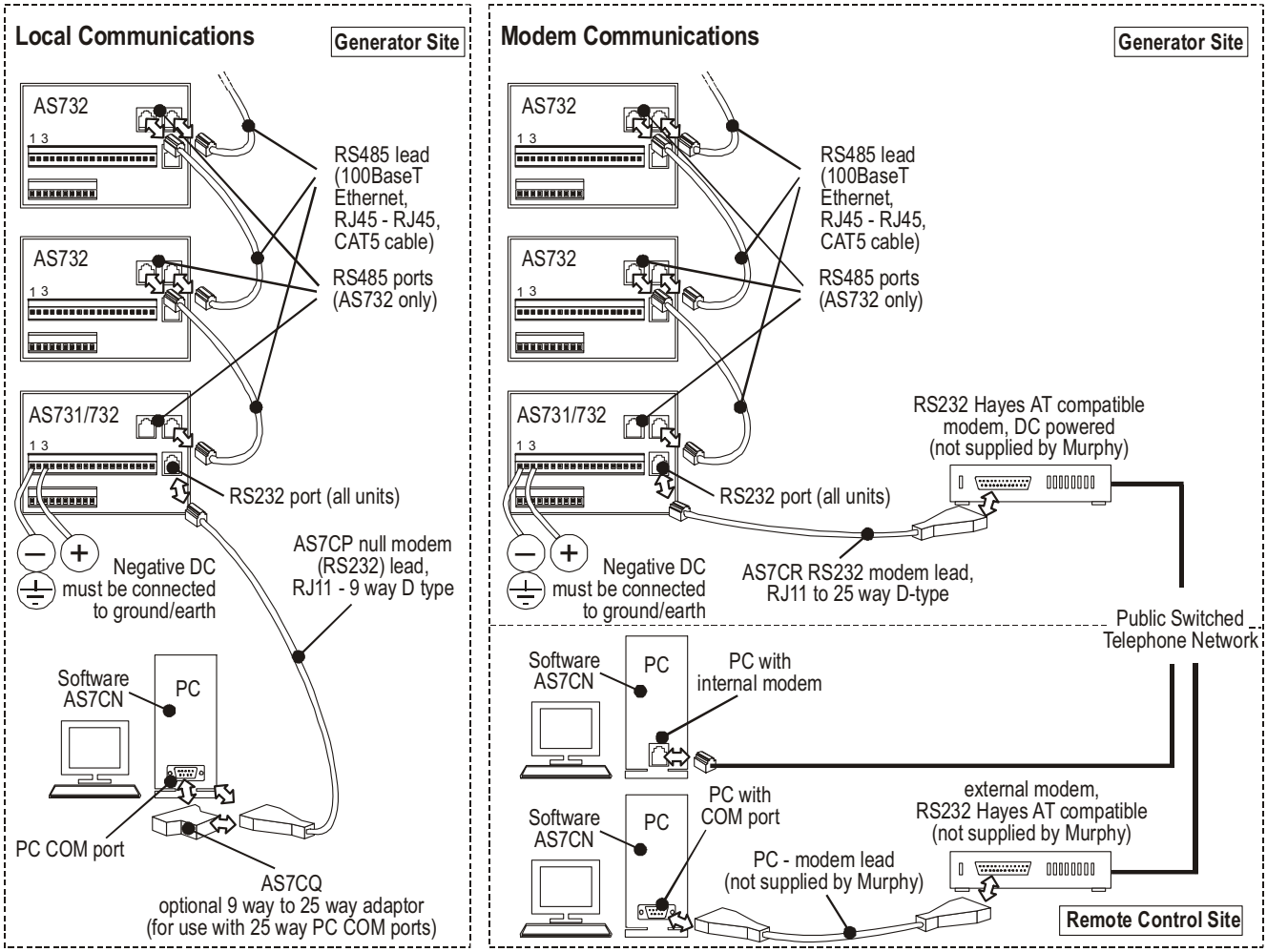


Program options

The AS732 has over 60 programmable functions, allowing complete flexibility of inputs, outputs, timers and engine/generator control options. Program configuration may be carried out from the front facia or by software AS7CN and RS232 link.

Timers:	Start delay; crank time; crank rest time; number of start attempts; alarm override (on start); speed signal/overshoot delay; engine warm-up delay; (mains) restore delay; engine cool time; energised to stop time; remote test time.
Battery DC	Low and high battery volts warning; charge alternator fail voltage; charge start (low battery) voltage; charge start period.
Generator AC	1/2/3 phase selection; over/under voltage levels; under voltage response; over/under speed/frequency levels; under speed/freq. response. Over current settings: full load; CT ratio; IDMT constant; warning/shutdown response.
Inputs	2 x analog/switch inputs, 1 (oil pressure) and 2 (engine temp): sender/switch type; display units; warning/shutdown levels. 3 x switch inputs: open/closed to activate; input 'action' (15 options including shutdown fault, warning fault, load release, test, start, stop, manual restore, etc); programmable fault messages.
Outputs	4 outputs, each with 50+ control or fault signalling options.
General	Access ID codes; unit/site ID; power up message; RS485 address.

AS732 Communication



How to order

Stock no.	*Model, description*
76.70.0338	AS732 generator controller

Optional accessories:-

76.70.0310	AS7CP, local RS232 comms (null modem) lead, for use with 9 way PC COM ports
76.70.0312	AS7CQ, adapter for above when using 25 way PC COM ports
76.70.0311	AS7CR modem RS232 lead, RJ11 to 25 way D type connectors

Software model AS7CN is available for free of charge download from our web site: **www.fwmurphy.co.uk/download**

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

Further information

Doc. ref.	*Title*
mi6128	AS731/732 installation A: fitting and connection
mi6129	AS731/732 installation B: programming
mi6243	AS731/732 installation C: AS730 to AS731/AS732 retrofitting
mi6130	AS731/732 operation
mi6131	AS731/732 and PC software model AS7CN
mi6344	AS732 RS485 MODBUS RTU protocol

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

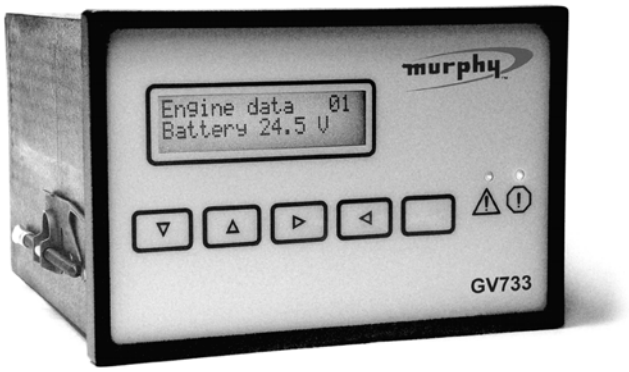
MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

GV733
Display and Diagnostic Module

ys6371
revision D, 20th May 2005
catalogue section 75



- **Interfaces with Cummins G-Drive* RS485 Modbus**
- **Displays engine data, configuration, fault status and history**
- **LED indication of warning or shutdown faults**

Description

The GV733 is a display module for use with the RS485 Modbus interface found on many Cummins G-Drive* engines, including models QSX15, QST30 and QSK23/45/60/78.

The back-lit LCD and simple navigation keys provide plain English readout of engine configuration, running data, current faults and recent fault history: see overleaf for a full listing of data displayed.

The GV733 case can be mounted in a standard DIN 140 x 92 mm panel cut-out. Electrical connection of the power supply and RS485 network is by 4 screw terminals on a removable block at the rear. The RS485 network may be alternatively connected through 2 x RJ45 sockets, fitted at the rear of each unit and supplied with a network terminator.

Application

The GV733 can be used as a user-interface for genset operators or as a basic diagnostic module for service engineers.

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

Product specification

Power supply:	
operating voltage: steady state range	5 – 40 V DC continuous
crank brown-out	to 0 V for >=100mS
current consumption (typ):	55mA @ 24V DC
Communications:	
RS485 connection	screw terminals (+ and –), also 2 x RJ45 socket with 1 x terminating plug/resistor
RS485 voltage isolation	1000 V
RS485 Baud rate	9600
RS485 maximum network length	1000 metres
RS485 protocol	MODBUS RTU, packet upload interval approx. 250mS
RS232 connection (for updates only)	RJ11 socket
RS232 Baud rate	9600
RS232 max. lead length	10 metres
Physical:	
overall dimensions (W x H x D)	144 x 96 x 162 mm
panel cut-out size (W x H)	DIN standard 140 x 92 mm
weight	approx. 500 g
operating ambient temperature	–10 to +55 °C

**Cummins and G-Drive are trademarks of Cummins Inc.*

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS & SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

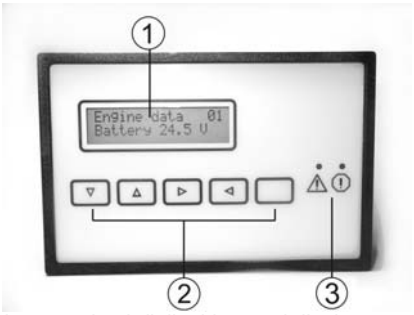
MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

INDUSTRIAL PANEL DIVISION
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

Front facia

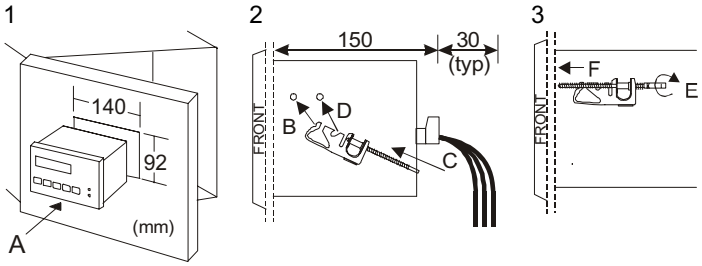


1) 2 line x 16 character back-lit liquid crystal display
2) Display scroll control keys:-
3) Fault warning (amber) and shutdown (red) LED indicators

Rear facia

4) Mounting clamps
5) 1 x two part, screw terminal block
6) 1 x RJ11 connector, RS232 communication/upgrade port
7) 2 x RJ45 connectors (RS485 Modbus alternative connection), shown with 1 x network terminator (supplied)

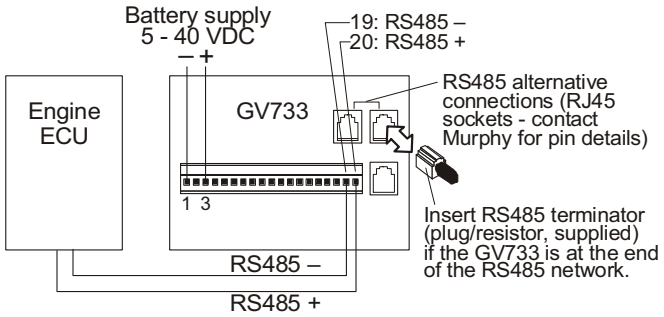
Installation



How to order

stock no.	*model / description*
76.70.0340	GV733 display and diagnostic module

Electrical connection



Display data parameters

Use ◁ and ▷ to select data type, then △ and ▽ keys to scroll through available data:-

*Note: * available on QSX15 engines*
*** available on QST30 engines*
**** available on QSK23/45/60/78 engines*

Engine sensor parameters:
Engine speed
Coolant temperature
Oil pressure
Ambient air pressure
Intake manifold pressure
Intake manifold temperature
Coolant level
Aftercooler water inlet temp***
Blowby flow***
Coolant pressure**/***
Fuel pump pressure***
Fuel rail pressure***
Fuel outlet pressure*
Fuel supply pressure**
Fuel temperature**
Oil temperature*/**
Fuel inlet temperature***
Timing rail pressure***
Fuel rack position, left & right**

Adjustable input settings:
Frequency adjust pot.
Droop adjust pot.
Governor gain adjust pot.

Fault / diagnostic data:
Active warning fault events
Active shutdown fault events
Most recent fault events

Other data
Battery voltage
Engine running time
ECM on-time
Base frequency
Base speed
Final speed reference
Estimated torque
Load profile monitor (50 & 60 Hz)
Fuel consumption rate
Cumulative fuel consumption

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
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fax: +1 918 317 4266
email: sales@fwmurphy.com
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fax: +1 281 633 4588
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tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
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web: www.murphymex.com.mx

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Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
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FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

UVR, OVR, CVR and PFR series
AC voltage relays

ms6261
revision B, 4th November 2003
catalogue section 75

- **Under/over voltage monitoring and tripping**
- **Adjustable trip/reset voltages**
- **Single or 3 phase options**
- **DIN rail or surface mount**

Description

The Murphy range of voltage relays provide monitoring of single or three phase AC mains/generator supplies. Relay outputs give controlled signalling/tripping at customer set voltage levels.

Our range includes:-

UVR/OVR100 series	Under and over voltage relays, single phase systems
UVR/OVR500 series	Under and over voltage relays, three phase and neutral systems
CVR500	UVR500 and OVR500 combined into one case
PFR500 series	Phase failure (under voltage) relays for 3 phase, 3 wire (no neutral) systems, with optional phase rotation check circuit (R option).

Each relay circuit includes:

- a double pole change-over relay, configured to be energised at normal AC voltage.
- an LED to indicate the relay state: the LED lights when the relay is energised (when AC voltage is healthy)
- a front facia 'set volts' adjustment control, for setting the under/over trip voltage. UVR, OVR and CVR units also have a 'differential volts' adjuster, allowing independent setting of the relay reset voltage.

On **UVR and CVR units**, the under voltage relay de-energises if any of the phase to neutral input voltages fall below the 'set volts' level. The relay does not energise (or the UVR LED light) until all phase to neutral voltages are restored to above the set volts *plus* the (adjustable) differential voltage.

On **OVR and CVR units**, the over voltage relay de-energises if any of the phase to neutral voltages rises above the 'set volts' level. The relay does not energise (or the OVR LED light) until all the phase to neutral voltages return below the set voltage *minus* the differential voltage. The over voltage relay also de-energises on total loss of supply.

Specification

AC input/power supply:	
undervoltage trip range	see 'how to order' overleaf
overvoltage trip range	see 'how to order' overleaf
trip point differential volts	see 'how to order' overleaf
maximum input voltage	see 'how to order' overleaf
power consumption	< 20 VA
operating frequency	see 'how to order' overleaf
relay output:	
contact type	2 x volt free DPDT contacts
contact rating	5 A max. @ 240 V AC (resistive)
rated operations	2 x 10^5 operations at rated load
trip time	approx. 500 mS
general:	
ambient temperature	–10 to +55 °C
dimensions (W x H x D)	see diagrams overleaf
weight (approx.)	UVR, OVR, PFR: 360 g CVR: 775g

On **PFR units**, two phase voltages are compared with the third phase. The relay de-energises if either phase to phase voltage falls below the set level. The relay does not energise until the phase to phase voltages rise above the set volts level *plus* the (fixed) differential voltage. On 'R' option units, the relay only energises if the correct phase sequence is connected.

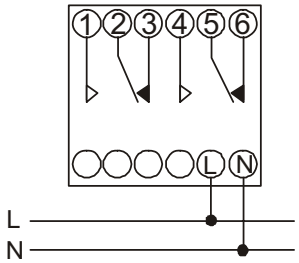
Electrical connection to all units is via screw terminals (accepting stripped wires or narrow blade crimps). Each unit has a robust polycarbonate casing, designed for DIN rail or surface mounting.

Warranty

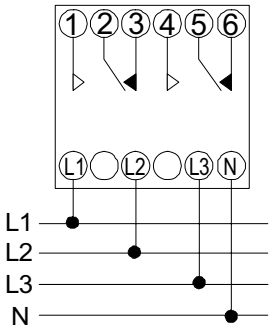
A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request or at **www.fwmurphy.co.uk/warranty**.

Electrical connection

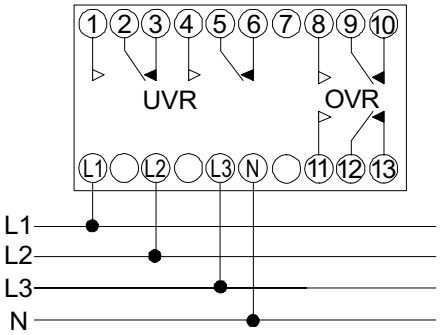
UVR100, OVR100, UVR101



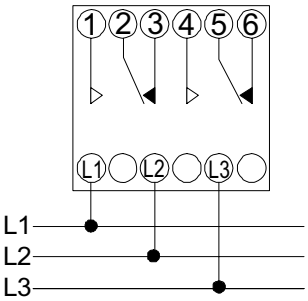
UVR500, OVR500, UVR501



CVR500

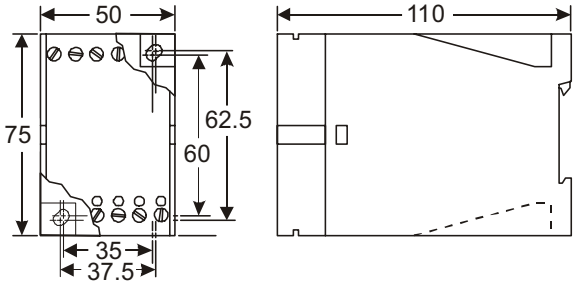


PFR series

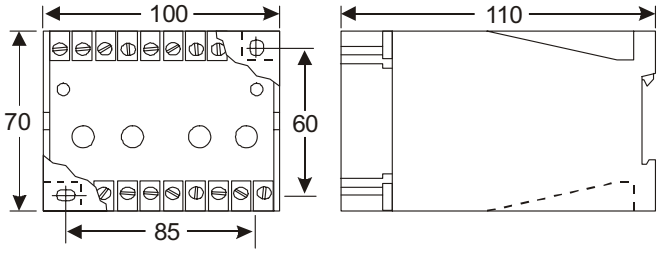


Dimensions

UVR, OVR and PFR



CVR



How to order

Stock No.	Model	under (U) or over (O) volts relay operation	nominal operating frequencies (Hz)	single phase nominal (max.) voltage	3 Phase and neutral nominal (max.) voltage, VAC ph-N	3 Phase, no neutral nominal (max.) voltage, VAC ph-ph	set (trip) voltage adjustment range	(trip point) differential voltage
76.70.0024	**UVR100**	U	50/60/400	230 (280)	-	-	160 - 240 VAC	2 - 26 VAC
76.70.0009	**UVR101**	U	50/60/400	110 (150)	-	-	70 - 110 VAC	1 - 13 VAC
76.70.0061	**OVR100**	O	50/60/400	230 (280)	-	-	200 - 280 VAC	2 - 26 VAC
76.70.0031	**UVR500**	U	50/60/400	-	230 (280)	-	160 - 240 VAC ph-N	2 - 26 VAC ph-N
76.70.0010	**UVR501**	U	50/60/400	-	110 (150)	-	70 - 110 VAC ph-N	1 - 13 VAC ph-N
76.70.0055	**OVR500**	O	50/60/400	-	230 (280)	-	200 - 280 VAC ph-N	2 - 26 VAC ph-N
76.70.0056	**CVR500**	U/O	50/60/400	-	230 (280)	-	160 - 240 VAC ph-N 200 - 280 VAC ph-N	2 - 26 VAC ph-N 2 - 26 VAC ph-N
76.70.0177	**PFR500**	U	50/60/400	-	-	400 (480)	320 - 420 VAC ph-ph	10 VAC ph-ph
76.70.0178	**PFR500-R**	U	50/60	-	-	400 (480)	320 - 420 VAC ph-ph	10 VAC ph-ph

Related products:-

UFR/OFR series AC frequency relays, see bulletin ms5734
OLR600 AC over current relay, see bulletin ms6262
ECD series AC earth leakage current detector relays, see bulletin ys6316

FRANK W MURPHY LTD.
Church Road, Laverstock, Salisbury, SP1 1QZ, United Kingdom
tel: +44 (0)1722 410055 **fax:** +44 (0)1722 410088
email: sales@fwmurphy.co.uk **web:** www.fwmurphy.co.uk

ECD series
Earth Current Detector Units

ys6316
revision B, 4th April 2003
catalogue section 75

- **Earth leakage protection for machinery and wiring**
- **Compact unit with integral current transformer**
- **Fixed and adjustable current/time variations**

Description

A range of versatile and economical AC earth leakage detection relays, designed to protect electrical equipment and wiring from earth fault currents. The units are typically used in conjunction with a circuit breaker or contactor.

IMPORTANT: this unit is not suitable for use as a personnel protection device against direct contact with a high voltage supply.

The ECD uses the 'residual current' principle or operation: the installation cables to be monitored are passed through an integral core balance transformer, which gives an output in the event of an earth leakage current. The detection circuit combines a stable amplification of the transformer output with an ability to give high sensitivity and fast operating speeds. Detection of an earth fault results in the energisation and latching of a single pole change-over relay. The unit is reset by momentarily removing the auxiliary power supply.

Protection from excessive fault current and supply transients is fitted as standard, as is filtering to allow use with chopped waveform and variable drive applications.

Each unit is housed in a robust, glass filled nylon case. An aperture in the casing allows the installation cabling to be passed through the integral core balance transformer. For larger diameter cabling, the ECD may be wired with our remote core balance transformers (see bulletin ms5776).

The ECD is available with a range of fixed and variable trip current or trip time options. Units without adjustable time/ current settings have a 'test' button fitted into the front facia. On units with variable current or time settings, the test button is replaced by screwdriver adjustable potentiometers. All units have wiring for the connection of a remote test contacts.

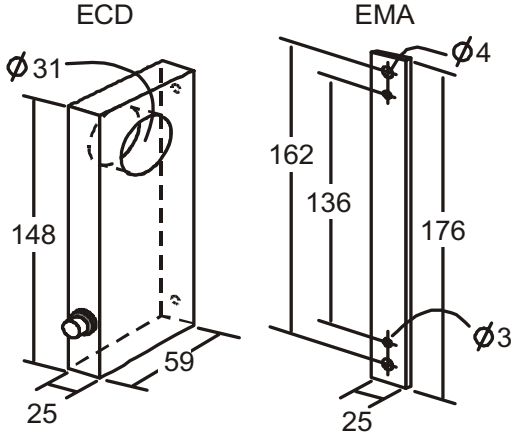
Electrical connection is by a colour coded, 6 way flying lead. The ECD can be physically mounted on a front panel or back-plate using two 3mm threaded inserts. An optional mounting assembly (model reference EMA) is also available for front access back-plate mounting.

Specification

Power supply:	
operating voltages (ranges) *(all for 50/60Hz.)*	110V AC (100 – 120 V) 230 V AC (200 – 250 V)
power consumption	< 100mA
Control:	
trip current/time	see 'how to order' overleaf for available options
Relay output:	*(ratings for resistive load)*
	SPDT contacts, rated 3A @ 250V AC/30V DC, 1A @ 440V AC
Physical:	
operating temperature	–25 to +60°C
weight (with EMA)	approx. 330 g

Dimensions and fixing

(mm)

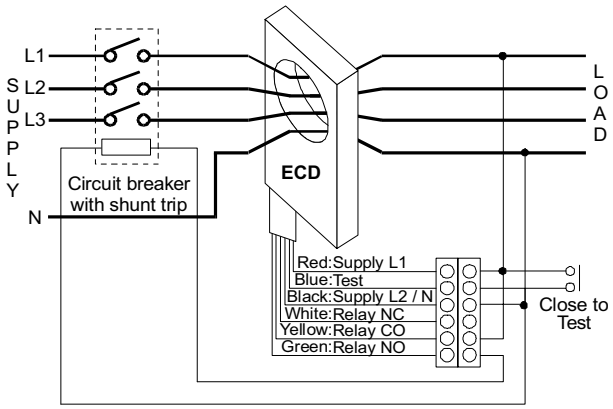


Warranty

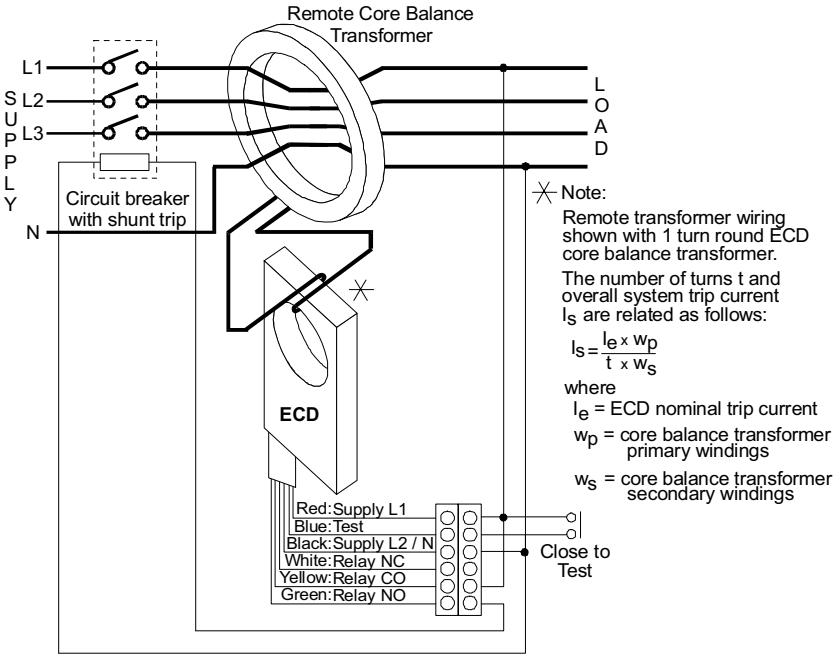
A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

Electrical connection

Using integral core balance transformer, auto reset



Using remote core balance transformer, auto reset



How to order

Stock code	*Description*			
	Supply voltage	*Nominal trip current **	*Nominal trip time **	*Test button*
76.70.1201	110 VAC	10 mA (fixed)	20 mS (fixed)	Integral or remote
76.70.1202	240 VAC	10 mA (fixed)	20 mS (fixed)	Integral or remote
76.70.1203	110 VAC	30 mA (fixed)	20 mS (fixed)	Integral or remote
76.70.1204	240 VAC	30 mA (fixed)	20 mS (fixed)	Integral or remote
76.70.1205	110 VAC	300 mA (fixed)	20 mS (fixed)	Integral or remote
76.70.1206	240 VAC	300 mA (fixed)	20 mS (fixed)	Integral or remote
76.70.1207	110 VAC	3 – 30 mA (adjustable)	20mS – 2 sec (adjustable)	Remote
76.70.1208	240 VAC	3 – 30 mA (adjustable)	20mS – 2 sec (adjustable)	Remote
76.70.1209	110 VAC	30 – 300 mA (adjustable)	20mS – 2 sec (adjustable)	Remote
76.70.1210	240 VAC	30 – 300 mA (adjustable)	20mS – 2 sec (adjustable)	Remote
76.70.1211	110 VAC	0.3 – 3 A (adjustable)	20mS – 2 sec (adjustable)	Remote
76.70.1212	240 VAC	0.3 – 3 A (adjustable)	20mS – 2 sec (adjustable)	Remote

Accessories

76.70.1088	EMA	ELD mounting plate and screws
76.70.1095	ERTB	Spare/remote test button

Remote Core Balance Transformers *(see bulletin ms5776 for full information)*

76.70.1089	ERC1	300:3 ratio, internal diameter 67mm
76.70.1090	ERC2	500:5 ratio, internal diameter 150 mm
76.70.1091	ERC3	300:3 ratio, internal diameter 55 mm
76.70.1092	ERC4	500:5 ratio, internal diameter 200 mm
76.70.1093	ERC5	500:5 ratio, internal diameter 80 mm
76.70.1094	ERC6	500:5 ratio, internal diameter 100mm
76.70.1129	ERC12	500:5 ratio, internal diameter 250 mm
76.70.1130	ERC13	500:5 ratio, internal diameter 300 mm

* Note: nominal trip currents and times are based on 50Hz use. When used with 60Hz systems, each ECD is approximately 10% more sensitive than the rated level.

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

In order to consistently bring you the highest quality, full featured products, we reserve the right to change our specifications and designs at any time.

ERC Core Balance Transformers

A range of core balance transformers for use with Murphy ECD and ELD earth current detector units, allowing these units to be used in applications with larger cable diameters and higher system trip currents.

Note: these transformers are not fully insulated; bus bars require insulating sleeves.

Core Balance Transformers (without screen)

Model	Ratio	VA	Approx. Dimensions (mm)					Approx. Weight (g)
			A	B	C	D	F	
ERC1	300:3	5	67	110	30	100	67	595
ERC2	500:5	5	150	190	30	150	108	1201
ERC3	300:3	5	55	90	30	100	57	405
ERC4	500:5	5	200	250	30	150	138	1808
ERC5	500:5	5	80	125	30	100	75	883
ERC6	500:5	5	100	145	30	100	85	784

Core Balance Transformers (with screen)

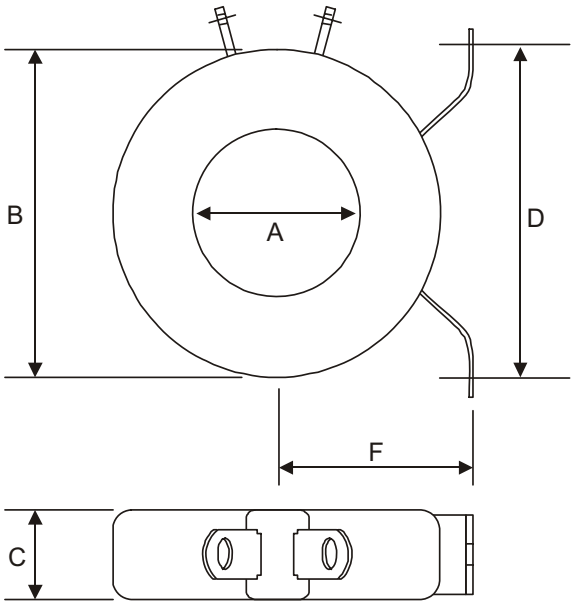
(N.B. these items are supplied without fixing feet)

ERC12	500:5	5	250	350	35	-	-	8.4 Kg
ERC13	500:5	5	300	400	35	-	-	10.0 Kg

Warranty

A two year limited warranty on materials and workmanship is given with this Murphy product. Details are available on request and at **www.fwmurphy.co.uk/warranty**.

Dimensions



A Internal Diameter
B External Diameter
C Width
D Fixing centres on feet
F From bottom of mounting foot to centre of aperture

How to order:–

Stock number	*Model/description*
76.70.1089	ERC1 transformer, 67mm internal diameter
76.70.1090	ERC2 transformer, 150mm internal diameter
76.70.1091	ERC3 transformer, 55mm internal diameter
76.70.1092	ERC4 transformer, 200mm internal diameter
76.70.1093	ERC5 transformer, 80mm internal diameter
76.70.1094	ERC6 transformer, 100mm internal diameter
76.70.1129	ERC12 transformer, 250mm internal diameter
76.70.1130	ERC13 transformer, 300mm internal diameter

MURPHY

FW Murphy
PO Box 470248
Tulsa, Oklahoma 74147, USA
tel: +1 918 317 4100
fax: +1 918 317 4266
email: sales@fwmurphy.com
web: www.fwmurphy.com

CONTROL SYSTEMS AND SERVICES DIVISION
PO Box 1819, Rosenberg, Texas 77471, USA
tel: +1 281 633 4500
fax: +1 281 633 4588
email: sales@fwmurphy.com

MURPHY DE MEXICO S.A. DE C.V.
Blvd. Antonio Rocha Cordero 300, Fracción del Aguaje
San Luis Potosí, S.L.P. México 78384
tel: +52 444 8206264
fax: +52 444 8206336
Villahermosa office tel: +52 993 3162117
email: ventasmex@murphymex.com.mx
web: www.murphymex.com.mx

FRANK W. MURPHY LTD.
Church Rd, Laverstock, Salisbury, SP1 1QZ, UK
tel: +44 1722 410055
fax: +44 1722 410088
email: sales@fwmurphy.co.uk
web: www.fwmurphy.co.uk

MURPHY SWITCH OF CALIFORNIA
41343 12th Street West,
Palmdale, CA 93551-1442, USA
tel: +1 661 272 4700
fax: +1 661 947 7570
email: sales@murphyswitch.com
web: www.murphyswitch.com

MACQUARRIE CORPORATION
1620 Hume Highway,
Campbellfield, Victoria 3061, Australia
tel: +61 3 9358 5555
fax: +61 3 9358 5558
email: murphy@macquarrie.com.au

USA - ISO9001:2000 FM 28221
UK - ISO9001:2000 FM 29422

FRANK W MURPHY LTD.
Church Road
Laverstock
Salisbury
SP1 1QZ
United Kingdom
Tel: +44 (0)1722 410055
Fax: +44 (0)1722 410088
Email: sales@fwmurphy.co.uk
http://www.fwmurphy.co.uk

A wholly owned subsidiary of:-

FWMurphy
PO Box 470248
Tulsa
Oklahoma 74147
USA
Tel: +1 918 317 4100
Fax: +1 918 317 4266
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