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BG-FILTDIFF

FILTER MONITOR

or

**DIFFERENTIAL
PRESSURE SWITCH**

USER INSTRUCTION MANUAL

JANUARY 2023 (V2)



1. Mounting

Remove the four plastic screws from the corners of the face.

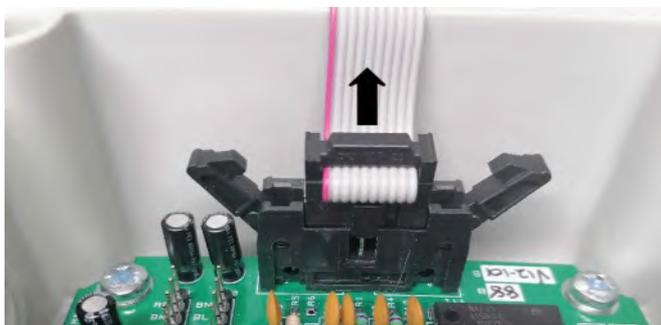
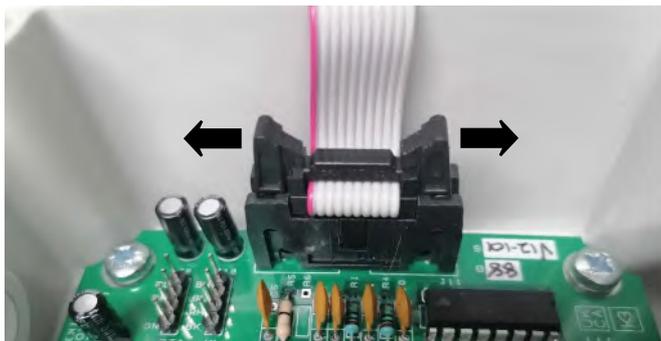
Underneath the plastic face screw holes are four mounting holes on the Base in each corner. Using these holes maintains the IP66 rating of the box.

The holes are on a 95mm square.

Use 4x No.8x1/2" (4.2x20mm) or similar screws to mount on a flat surface. Depending on the surface, wall plugs may be required.

1.1 Remove Display Face

Best to remove the display for clarity, and to stop it getting damaged during installation. The Display is connected to the Main (Base) Board with a Ribbon Cable terminated on a black Connector. Splay the Connector Wings apart and the Connector will eject. Set aside the Display for reattachment later.

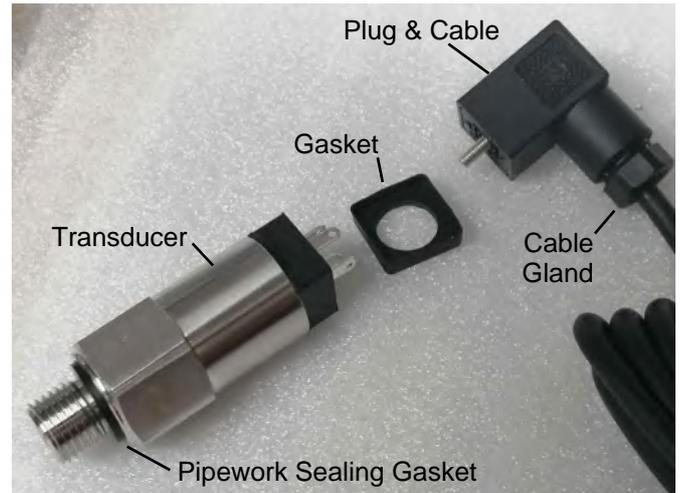


1.2 Install the Pressure Transducers

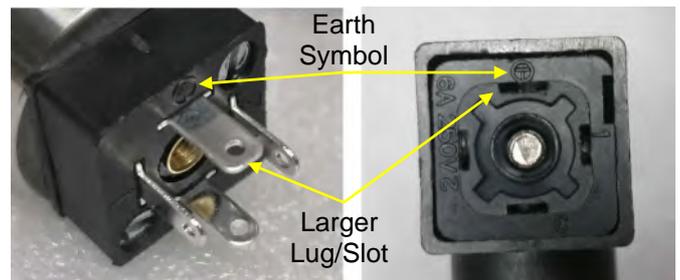
Two Transducers require mounting (1/4" BSPM), one in the upstream pipework before the Filter, and one downstream after the Filter.

It is probably best to UNPLUG the cable from the Transducer first (saves it being wound round and

round during fitting). Unscrew the centre top screw holding the plug on the Transducer, and pull the plug away. Note the way the Gasket fits - don't lose it, replacements are not available.



Note that the Transducer has one connecting Lug bigger than the others - when reassembling it has to mate into the bigger slot in the connecting Plug (usually marked with an Earth symbol).



The Transducer has an integral sealing gasket at the top of the thread and does not require any sealant or tape when screwing into the pipework. However, this sometimes means the cable exit (which is at 90 degrees from the plug) ends up pointing in an undesired direction for a neat cable exit. In this case, simply unscrew the cable gland, remove the fixing screw, push the cable to cause the plug to exit the shell (you may need to use a small screwdriver to tease the plug away from the shell), rotate the plug part 90 or 180 degrees, and reinsert. Carefully route any wires away from the central screw to prevent damage to the wires.



2. Electrical Connection

2.1 Supply

The Filter Alarm requires a 240vAC Supply.

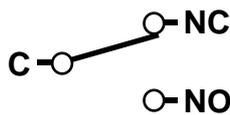
Thread the Power Cable (from an isolating switch) through the bottom left M20 Cable Gland (assuming you've mounted the unit as per the photograph below). The green connectors unplug to make wiring easy and only fit one way around.

Connect wires E=Earth, L=Live and N=Neutral to the SUPPLY Connector at J1.



2.2 Volt-Free Telemetry Connection

If an Alarm Signaling connection to a BMS or other remote location is required, then connect to green connector at J5 (and optionally J6 if fitted). These are VOLT-FREE, meaning they are simply a contact that changes over on alarm. C=Common, NC=Normally Closed, and NO=Normally Open.



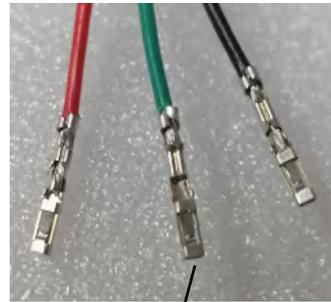
2.3 Pressure Transducer Connection

Thread the Pressure Transducer Cables back to the Alarm Unit through whichever Cable Gland is most convenient.

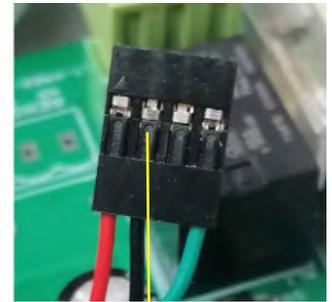
The wires (Red, Black/Blue and Green) are crimped in the factory. Don't damage these crimps. The crimp pins fit/slide into a shell and lock in place when inserted.

Each wire pin (only with the wire/crimp part uppermost), slides into the shell housing, and a tiny plastic pin latches it into place.

Insert and latch as per the picture, **RED** on one end, followed by **BLACK/BLUE**, then there's a blank (factory fitted), and finally **GREEN** at the other end.



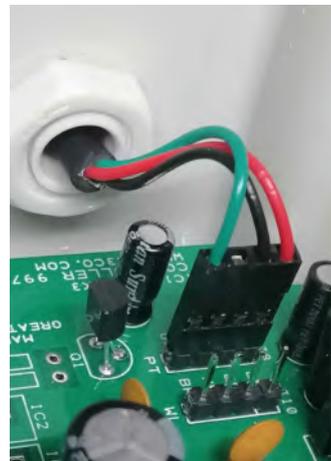
This way up for Pressure Transducer Crimp Pins



Plastic securing Pins

Remember the sequence, **RED, BLACK/BLUE**, then a space, finally **GREEN** - just like in the above picture. If you make a mistake and need to remove a wire, insert a small blade (such as a scalpel) underneath the end of the Plastic Securing Pin and lever gently up to release the Crimp.

Finally plug the assembled connector into the circuit board. Note the RED wire orientates towards the edge of the board as in the picture below. For future reference, the Transducer you plug into the PT socket we will call **TRANSDUCER-A**, and the Transducer plugged into the WL socket we will call



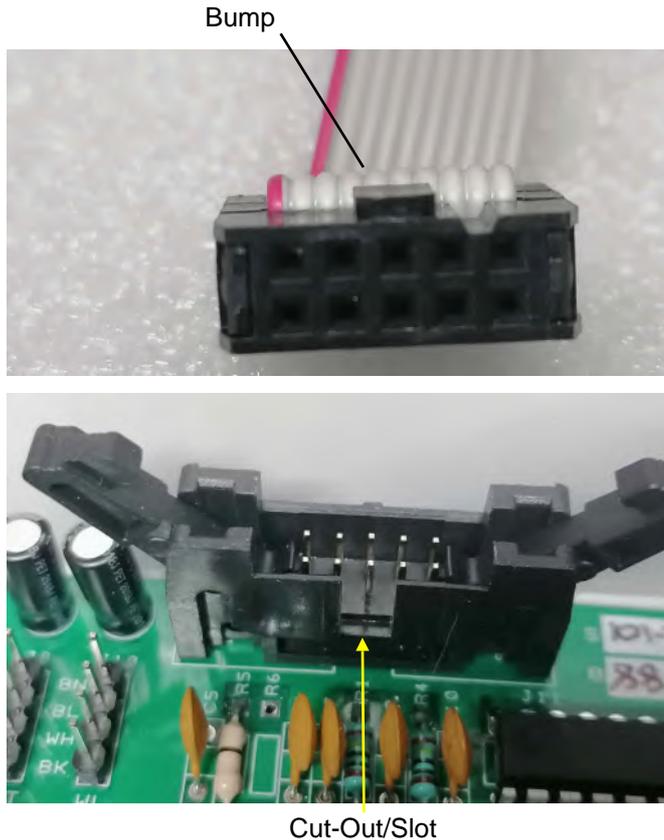
TRANSDUCER-B. It doesn't matter which Transducer is upstream, or which is downstream from the Filter. Tighten up the Cable Glands.

If you need to extend the Transducer Cables (they come with 900mm), use 3-pin waterproof in-line connectors and 3-core cable.

2.4 Re-attach the Display Face

Reconnect the Display that was previously set-aside in step 1.1

Note that the connector plug on the end of the ribbon cable has a BUMP on one long side, and the socket on the circuit board has a matching cut-out/slot similarly on one long side.



Orientate the plug and socket correctly together and push the plug firmly into the socket. The two wings/lugs that were splayed apart on either side of the socket will come up vertically and lock the plug into place (the reverse of the pictures at 1.1).

Screw the Display using the four plastic captive screws back onto the Base. You can orientate the Display any way you want for convenience (depending which way you mounted the base), but just don't twist the ribbon cable too many times.

3. Testing - (MATFAC)

Conveniently, there's a built-in test - MATFAC - it stands for **MA**nufacturing **T**est **FAC**ility.

Press and HOLD the left-hand (DOWN) Button whilst Powering-ON. When the word MATFAC appears (about 5 seconds), you can release the Button.

On the top line of the display, the digits on the left (0.00-10.0) represent the Pressure (in Bar) as reported by TRANSDUCER-A (remember it's the one plugged into the PT socket at step 2.3). If ERR is shown, you've messed-up connecting Transducer-A.

The digits on very right of the top line (0.00-10.0) represent the Pressure (in Bar) as reported by TRANSDUCER-B (remember it's the one plugged into the WL socket at step 2.3). If ERR is shown, you've messed-up connecting Transducer-B.

The centre Display is the DIFFERENTIAL between the two - it's calculated as:- Transducer-A minus Transducer-B = DIFFERENTIAL, so here (only in MATFAC) it can show a Positive or Negative Pressure value.

This is handy for testing your pipework, system pressure and filter.

The bottom line of the display represents the three Buttons.

The left-hand 'A' (DOWN) Button, if pressed will trip the STOP Relay, and blink GREEN the LED whilst beeping.

The centre 'B' (UP) Button, if pressed will trip the REMOTE Relay (if fitted), and blink the LED RED whilst beeping.

The right-hand (SET) Button will RE-BOOT the Filter Alarm Unit.

4. Software Set-Up

When the Filter Monitor ships from the factory, it's is 'ready to run' from initial Power-On.

When running, press the right-hand (SET) Button and the Unit will respond with "Enter PIN:"

Enter an appropriate PIN for either the Factory or the Engineering Set-Up Menu's, whilst the User Set-Up doesn't have a PIN set from the factory (all blanks), in that case just press the SET Button four times (like you are entering four blanks).

4.1 User Set-Up

4.1.1 Standby Mode : If set to *NO (Factory Default)* will allow the Controller to start operating as soon as Power is applied. If set to *YES*, will cause a '**STANDBY MODE**' message to appear on the LCD and the unit will remain in this mode until manually switched ON by a User (think of it as an ON/OFF Button on your TV Remote). Press and hold the SET Button for at least FIVE SECONDS to switch ON. Similarly, to switch *INTO* Standby Mode (from *NORMAL* operation), press and hold the SET Button for at least FIVE SECONDS (until the '**STANDBY MODE**' message appears - pressing for less than this time will cause the '**Enter PIN**' message - for entry into the SET-UP Menu to appear instead).

Caution: In STANDBY (or REMOTE OFF) MODE the equipment remains LIVE - Don't try to change the Control Panel (or any Transducers) without completely isolating the equipment from the supply.

4.1.2 Set SOON Press : Filter SOON Pressure Set-Point. The Differential Pressure at which the Order Filters Alarm is tripped (*FactoryDefault 0.6 Bar*).

4.1.3 Set NOW Press : Filter NOW Pressure Set-Point. The Differential Pressure at which the Change Filter NOW Alarm is tripped (*Factory Default 0.8 Bar*).

4.1.4 Pressure-Low Alarm ON : The value at which the Pressure LOW Alarm activates. The LOW Alarm is the LOWEST Pressure (regardless if Transducer-A or Transducer-B (*Factory Default 0 Bar - Disabled*))

4.1.5 Pressure-Low Alarm OFF : The value at which the Pressure LOW Alarm deactivates. The LOW Alarm is the LOWEST Pressure (regardless if Transducer-A or Transducer-B (*Factory Default 0 Bar - Disabled*))

4.1.6 Pressure-High Alarm ON : The value at which the Pressure HIGH Alarm activates. The HIGH Alarm is the HIGHEST Pressure (regardless if Transducer-A or Transducer-B (*Factory Default 5.0 Bar*))

4.1.7 Pressure-High Alarm OFF : The value at which the Pressure HIGH Alarm deactivates. The HIGH Alarm is the HIGHEST Pressure (regardless if Transducer-A or Transducer-B (*Factory Default 4.5.0 Bar*))

4.1.8 Latch SOON Alarm : This with LATCH the SOON Alarm ON even if the Alarm was momentary (*Factory Default N - No*)

4.1.9 Latch NOW Alarm : This with LATCH the NOW Alarm ON even if the Alarm was momentary (*Factory Default N - No*)

4.1.10 Alarm Delay : Delays the start of any external ALARM reporting by a given number of seconds (0-180) to prevent possibility of inertial false alarms. (*Factory Default = 15 Seconds*).

4.1.11 STOP Relay : This is the Relay (volt-Free Contact) that would normally be connected (via connector J5) to signal an external Alarm (eg a BMS or Remote Alarm in the Janitors office). This option sets all the conditions that will enable the STOP Relay. The Relay activation conditions are:-

PRESSURE LOW
PRESSURE HIGH
CHANGE/ORDER FILTER SOON
CHANGE FILTER NOW
SERVICE DUE
SYSTEM FAILURE

Each option can be turned ON or OFF, so in this manner the Relay can be activated by multiple events (eg on CHANGE FILTER SOON **and** CHANGE FILTER HIGH **and** PRESSURE HIGH **and** ... etc, etc). By default the User will 'Skip Sub-Menu' if SET is simply pressed, however by using the UP and DOWN Buttons to change this to 'Configure' and then pressing SET, the User can then enable or disable all the multiple options that will trip this Relay. The **FAILSAFE** option reverses the operation of the STOP Relay (*ie so it is normally ON and drops out on Alarm, rather than normally OFF and switching ON for Alarm*). Fail-safe allows for the provision of signaling an Alarm on Power-Failure. Naturally the NC/NO contacts as marked on the PCB operate in reverse if the Failsafe setting is used.

4.1.12 **REMOTE Relay** : This is the Relay that would normally be connected (via connector J6) to a second REMOTE monitoring facility. Just as in the STOP Relay (4.11), this option sets the conditions that will enable the REMOTE Relay.

4.1.13 **Beeper** : Configured in a similar way to the the STOP Relay (4.11), this option sets all the conditions that will enable the Beeper to sound an Alarm condition. **KEYPRESS** is the audible feedback 'bip' whenever you press a Button.

4.1.14 **Alarm LED** : Configured in a similar way to the the STOP Relay (4.11), this option sets all the conditions that will enable the Alarm LED to blink a RED Alarm.

4.1.15 **Set LCD Contrast** : Changes the LCD Contrast as required. (*Factory Default 3*)

4.1.16 **Set LCD Backlight** : Changes the LCD Backlight Level as required. (*Factory Default 5*)

4.1.17 **User PIN** : A 4 character Password/PIN. (*Factory Default not set - all blanks/spaces*)

4.2 Master (Engineering) Set-Up

Sometimes referred to as *ENGINEERING SETUP*. (Entered through a VALID Master PIN)

4.2.1 **Service Due** : A value set here will trigger a SERVICE DUE message once the SERVICE HOURS have incremented to this value. (*Factory Default is 10200 Hours - approx 14 months*).

4.2.2 **Safety Stop** : A YES here (*Factory Default NO*) will shut-down the Controller 14 days after a SERVICE DUE message has started to be displayed. This will force the system to be serviced (as it will not continue to run) in those installations where due to Health and Safety or other security reasons periodic service is critical.

4.2.3 **System Locked** : When set to YES (*Factory Default NO*) will LOCK-OUT the installation from working. Prevents an installation from operating if discovered for whatever reason to be dangerous.

4.2.4 **Service Hours** : This is the rough cumulative HOURS COUNTER telling you how long a system has been running. You are able to RESET this counter to ZERO by using the UP/DOWN Buttons to display RESET and then pressing SET. This is the option to use when resetting from a Service Due Alarm.

4.2.5 **Transducer-A Type (Span)** :

The maximum span of the Transducer fitted to the system. (*Factory Default 10.0 Bar*).

4.2.6 **Transducer-A Cal** : A factory trimmed value (*Factory Default 50*) that can be used to adjust for critical installations that require greater accuracy. Adjustment outside of the Factory is not recommended as it requires specialist equipment to calibrate. *Recommended as a special order item from the factory.*

4.2.7 **Transducer-B Type (Span)** :
The maximum span of the Transducer fitted to the system. (*Factory Default 10.0 Bar*).

4.2.8 **Transducer-B Cal** : A factory trimmed value (*Factory Default 50*) that can be used to adjust for critical installations that require greater accuracy. Adjustment outside of the Factory is not recommended as it requires specialist equipment to calibrate. *Recommended as a special order item from the factory.*

4.2.9 **Master PIN** : A 4 character Password/PIN.

4.3 Factory Set-Up

4.3.1 **Name** : A 16 character alphanumeric NAME (usually Company or Organisation name) that is permanently displayed during normal operation.

4.3.2 **Telephone** : A 16 character TELEPHONE which will be circulated on the display prompting the viewer to call in case of any serious error.

4.3.3 **Restrict User Options** : A YES/NO option (*Factory Default is NO*). There are an awful lot of USER SETUP options. Customers will play and tinker and can really screw things up in the field. If set to YES, it restricts the USER to just being able to change (User PIN required):-

Change/Order Filter SOON Set-Point
Change Filter NOW Set-Point
Pressure Low Alarm ON/OFF Settings
Pressure High Alarm ON/OFF Settings
Latch SOON Alarm (Y/N)
Latch NOW Alarm (Y/N)

4.3.4 **Numeric only PIN**: A YES/NO option (*Factory Default is NO*). Restricts the PIN to only the NUMERALS (0-9). Any existing passwords will remain unchanged. *It should be NOTED that the **FACTORY, MASTER and USER** passwords should be set to numerics **FIRST**, and **BEFORE** selecting YES here (ie the numerals 0-9 only), otherwise those sections will be locked-out and unaccessible if any alpha or special non-numeric characters are left in those passwords.*

4.3.6 **Factory PIN** : A 4 character Password/PIN.