



Operating Manual

DOCUMENT CONTROL

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CHANGE LOG

Date	Rev.	Change
15/12/2016	A	New release
21/12/2016	B	Added 24VDC NPN and DeviceNET options
17/01/2018	C	Added Hi-Viz installation section

We reserve the right to make technical changes without notice.
Technische Änderungen vorbehalten.
Sous réserve de modification techniques.

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Operating Manual

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1. OPERATING INSTRUCTIONS

The operating instructions describe the entire life cycle of the device. Keep these instructions in a location which is easily accessible to every user, and make these instructions available to every new owner of the device.



WARNING!

The operating instructions contain important safety information!

Failure to observe these instructions may result in hazardous situations.

- The operating instructions must be read and understood.

Symbols:



DANGER!

Warns of an immediate danger!

- Failure to observe the warning will result in a fatal or serious injury.



WARNING!

Warns of a potentially dangerous situation!

- Failure to observe the warning may result in serious injuries or death.



CAUTION!

Warns of a possible danger!

- Failure to observe this warning may result in a moderate or minor injury.

NOTE!

Warns of material damage!

- Failure to observe the warning may result in damage to the device or the equipment.



Indicates important additional information, tips and recommendations.



Refers to information in these operating instructions or in other documentation.

⇒ Designates a procedure which you must carry out.

2. AUTHORISED USE

Incorrect use of the control head F783 Easymind 2.0 may be dangerous to people, nearby equipment and the environment.

The control head has been designed for use as actuation of pneumatically operated valves and / or for recording the switching states of these.

The authorised data, the operating conditions and conditions of use specified in the contract documents and operating instructions are to be observed during use. These are described in Chapter "6. Technical Data".

In view of the large number of application options, check and, if required, test prior to installation whether the control head is suitable for the specific application case.

If you are unsure, please contact your Pentair Flow TechnologiesPacific Pty. Ltd contact.

The device may be used only in connection with third-party devices and components which have been recommended or approved by Pentair Pentair Flow TechnologiesPacific Pty. Ltd.

Any unauthorized reconstructions and changes to the control head are prohibited for safety reasons.

Correct transportation, correct storage and installation as well as careful operation and maintenance are essential for reliable and problem-free operation.

For connecting the control head, use line installations that do not cause any mechanical stresses.
Use the device only as intended.

2.1 Export Restrictions

If exporting the system/device, observe any existing restrictions.

3. BASIC SAFETY INSTRUCTIONS

These safety instructions do not make allowance for any:
Contingencies and events which may arise during assembly, operation, and maintenance of the devices.

Local safety regulations - the operator is responsible for observing these regulations, also in relation to the installation personnel.



DANGER!

Danger - high pressure!

Before loosening lines and valves, turn off the pressure and vent the lines.

Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)

Opening the control top in an explosive atmosphere is only allowed in a non-energised state
Use only cables and cable glands which have been approved for the respective application area and which have been installed according to the respective installation instructions. Do not expose the device to any mechanical or thermal loads exceeding that described in the operating instructions



WARNING!

Warning - Risk of electric shock!

Before reaching into the system switch off the power supply and secure it to prevent restarting!
Observe applicable accident prevention and safety regulations for electrical equipment!

General hazardous situations.

To prevent injuries:

Ensure that the system cannot be activated unintentionally.

Installation and maintenance work, as well as operator control actions may be carried out by authorised and qualified technicians only and with the appropriate tools.

Do not make any unauthorized internal or external changes to the device!

After an interruption in the electrical or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.

The device may be installed and operated only when in perfect condition and in consideration of the operating instructions. The general rules of technology apply to application planning and operation of the device.

NOTE!**Electrostatic sensitive components/modules!**

- The device contains electronic components which react sensitively to electrostatic discharge (ESD). Contact with electrostatically charged persons or objects may be hazardous to these components. In the worst case scenario, they will be destroyed immediately or will fail after start-up.
- Observe the requirements in accordance with EN 61340-5-1 to minimize or avoid the possibility of damage caused by sudden electrostatic discharge!
- Also ensure that you do not touch electronic components when the supply voltage is on!

NOTE!**Risk of damage to property**

- Do not connect any mechanically rigid connection parts, in particular those with long lever arms, as such connections could generate torques that might damage the control head.
- Do not supply the medium connections of the system with liquids or aggressive or flammable media!
- Do not subject the housing to mechanical loads (e.g. by placing objects on it or standing on it).
- Do not make any external changes to the housings of the device. Do not paint housing parts or screws.
- Only use compatible cleaning agents (e.g. isopropanol up to 70%) for cleaning the securely closed control head and always rinse thoroughly with clean water.



Control head F783E 2.0 was developed with due consideration given to accepted safety rules and is state-of-the-art. Nevertheless, dangerous situations may occur.

4. GENERAL INFORMATION

4.1. Contact address

Check immediately upon receipt of the consignment that the contents are not damaged and that the type and scope agree with the delivery note and packing list.

If there are any discrepancies, please contact us immediately.

Contact address:

Pentair Flow Technologies Pacific Pty. Ltd

12-14 Kaimiro St

Hamilton 3200

T: +64 (0) 7 958 7100

F: +64 (0) 7 958 7101

E: Email: PacificNZHygienicSales@pentair.com

Website: <http://foodandbeverage.pentair.com>

4.2. Warranty

Please refer to our general terms of sales and business.

The warranty is only valid if the control head is used as intended in accordance with the specified application conditions



The warranty extends only to defects in the control head F783E 2.0 and its components.

We accept no liability for any kind of collateral damage which could occur due to failure or malfunction of the device

4.3. Information on the internet

The operating instructions and data sheets for F783E control top can be found on the Internet at:

<http://foodandbeverage.pentair.com>

START OF CONTROLLED AREA**5. CERTIFICATION DETAILS****5.1. IECEX**

- 1. Manufacturer : Pentair Flow Technologies Pacific Pty. Ltd
- 2. Model : F783E
- 3. Certificate Number : IECEX ITA 11.0016X
- 4. Ex. Marking Code : Ex tc IIIC T90°C IP65
- 5. Ratings : IP65
- 6. Standards : IEC 60079-0:2011 Ed. 6
IEC 60079-31:2013 Ed. 2

5.2. ATEX

- 1. Manufacturer : Pentair Flow Technologies Pacific Pty. Ltd
- 2. Model : F783E
- 3. Certificate Number : TÜV 16 ATEX 7985X
- 4. Ex Marking Code :  II 3 D Ex tc IIIC T90°C
- 5. Ratings : IP65
- 6. Tamb : 0 < T < 50°C
- 6. Standards : EN 60079-0:2012/A11:2013
EN 60079-31:2014

5. CERTIFICATION DETAILS (Cont'd)

5.3. Conditions of Certificate

- ◆ It is a condition of safe use that suitable separately certified entry devices are utilised for external cable entry.
- ◆ It is a condition of safe use that the apparatus must be mounted so that there is a low risk of mechanical damage.
- ◆ The Valve Control Top F783E Ex. Version may only be used as explosion safe after proper installation to the process equipment (e.g. actuator) either directly or via a suitable mounting adaptor and when fitted with a suitable cable gland so that an ingress protection degree to a minimum of IP65 has been achieved.
- ◆ The equipment is to be cleaned with a damp cloth to ensure the minimization of electrostatic charge build up.
- ◆ The equipment is not to be mounted in direct sunlight

END OF CONTROLLED AREA

6. SYSTEM DESCRIPTION

6.1. Intended application area

The control head F783E 2.0 has been designed for use as actuation of pneumatically operated process valves and / or for recording the switching states of these.

6.2. General description

The control head F783E 2.0 is used for actuating pneumatically operated hygienic product valves.

For process valve actuation, the control head can be equipped with a single 2/5 solenoid valve.

For the recording and feedback of the process valve switching positions to a higher-level control, the control head has been equipped with up to two position feedback switches. These are PNP style inductive proximity switches.

The F783E control head mounts directly on standard Pentair actuators of figure number F257 and F272S. This produces an integrated, compact and decentralized system of actuation, valve function and feedback. The following advantages over centralised solutions working with valve clusters are achieved:

- low installation expenditure
- easy start-up
- shorter switching times and less air consumption due to shorter distances between the pilot valve and the process valve.

There is also a wide range of mounting options available for many other brand actuators in the hygienic food and beverage industry, as well as common industrial actuators. Please consult a customer services representative for more details on mounting options available.

Various pneumatic and electrical connection variants are available. Consult the selection guide on page 9 for more information on options.

6.3. Functions/options/designs

6.3.1. Structure of the control top

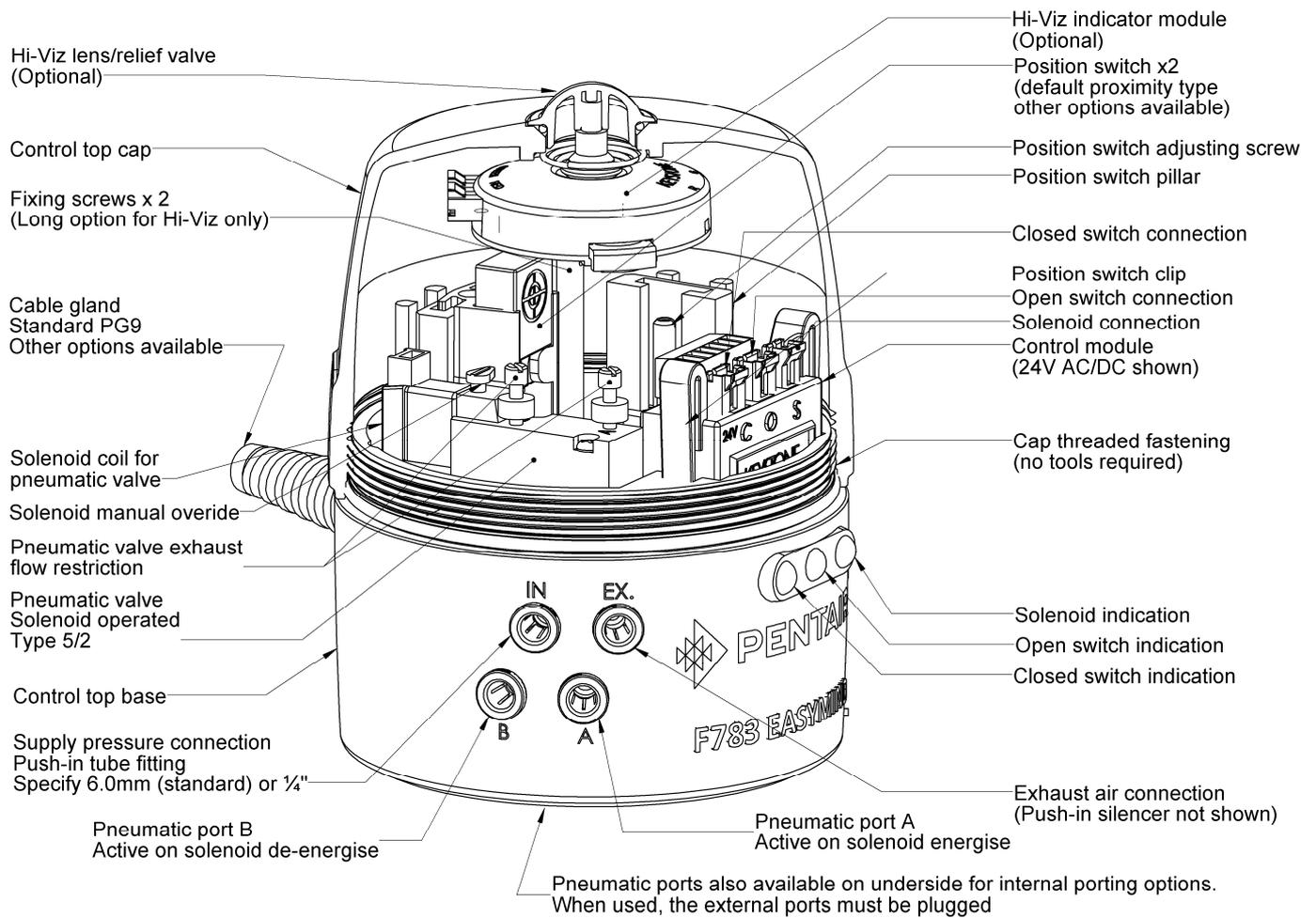


Fig 1: Structure of the control top

6.3.2. Fluid diagram

Control head F783E—fluid diagram (with restriction capability for solenoid valve)

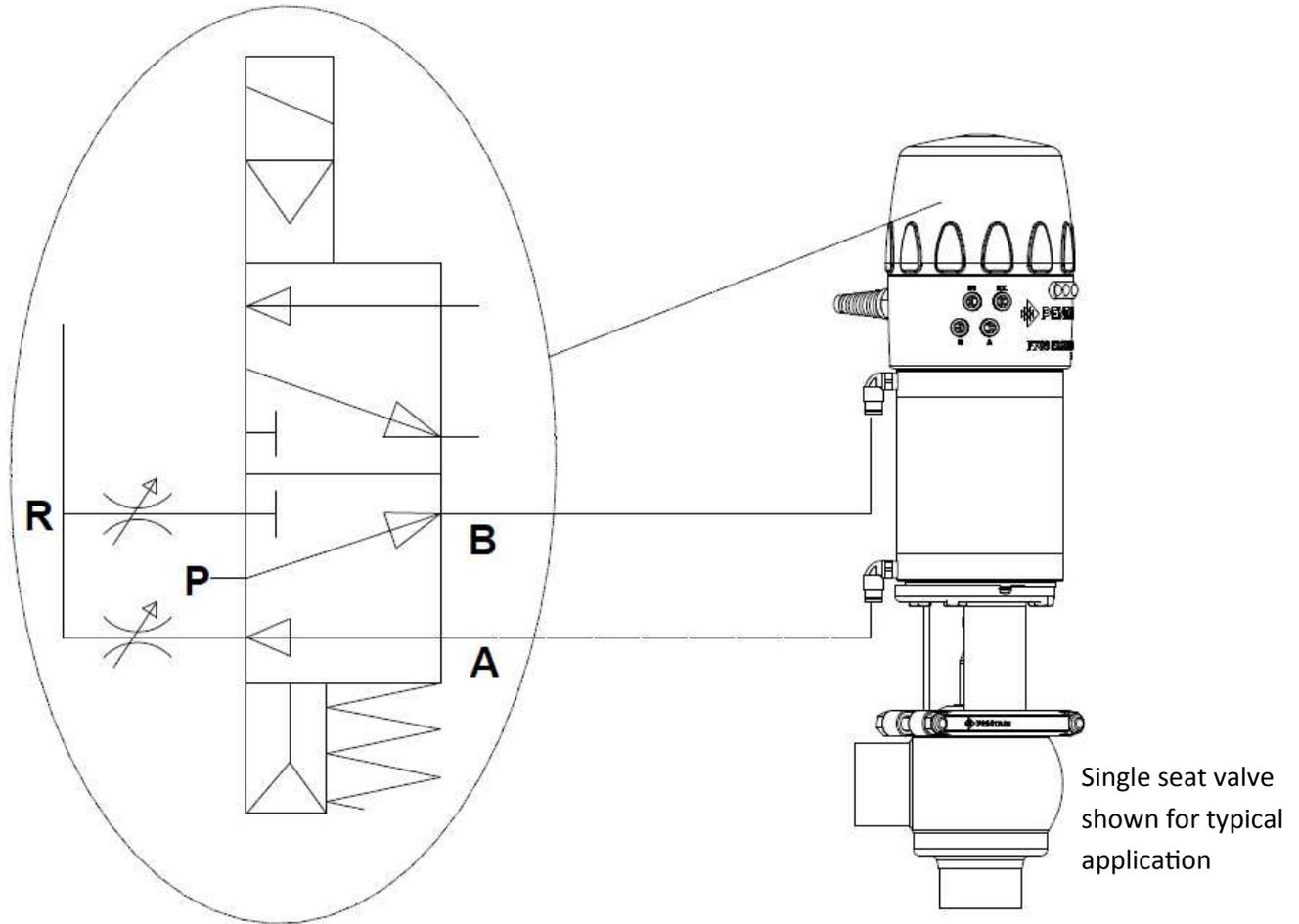


Fig 2: Pneumatic circuit for SMC SYJ5315 solenoid valve as installed in the F783E control head

6.3.3. Number of solenoid valves

The F783E 2.0 control head for process and butterfly valves has been designed for single-acting and double-acting valve actuators as well as for double seat and multi-position valves using a single solenoid valve.

The solenoid is a 5/2 type, with common exhaust. The pilot coil is very low power, 0.35W as standard. Flow restrictors are installed in the exhaust line of both ports, meaning the operating speed of the actuator can be controlled in both directions

6.3.4. Pneumatic interfaces

Intake & exhaust air connections: 6.0mm “One Touch” push in air fittings

Working connections: 6.0mm “One Touch” push in air fittings or internal porting option when fitted to the F257 type actuator (for ¼ turn operation)

Integrated flow regulator in the solenoid valves' exhaust air port

Collets are Nickel plated brass, stainless steel collets are available on request

6.3.5. Manual control

The SMC solenoid valve is provided with a push button to operate the valve manually. This button can be locked in position by rotating it clockwise slightly.

Care must be taken to ensure this override is returned to the off position when returning the valve to service.

The pilot solenoid has a red LED to indicate when it is powered. The 24V version of this pilot valve is unipolar, operating on AC or DC, and polarity is not significant.

6.3.6 Position monitoring system

The switching positions of the actuator are reported to the control system by feedback signals from two switches mounted on switch pillars within the housing.

The height and orientation of these switches can be adjusted to accommodate the stroke length of all F257 and F272S type actuators. This is achieved by adjusting the screw on the switch pillar to raise or lower the switch and turning the switch around in the retaining clip. Each switch pillar has 3 possible orientations to allow the use of different configuration switches.

The ¼ turn actuators use a special adjustable target set to accommodate target rotation between 0 and 180°.

6.3.7. Other features

Valve position is observed locally from the LED indicators on the control module installed in the control top, visible from the front of the control top. There are two variants of this control module:

24VDC (CE certified)

AS-interface (CE certified)

This module provides a single connection point for the control and feedback cabling from and to the supervising control system, as well as a connection point for the feedback switches and the solenoid inside the control head. In addition this control module has a number of LED indicators to display valve position and status, depending on the type of module installed.

- ⇒ Simple adaptation of the control head (for the position measuring system) to many valve types.
- ⇒ The capability of restricting the operation speed of the actuator in either direction.

An optional Hi-Viz position indicating unit can be installed, this reports the actuator position with high intensity LEDs mounted in the top, which cause the transparent lens/relief valve to glow in the appropriate colour for the valve position. The default colours for this are RED for closed, and GREEN for open.

7. TECHNICAL DATA

7.1. Operating conditions

**Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)**

Opening the control top in an explosive atmosphere is only allowed in a non-energised state
Use only cables and cable glands which have been approved for the respective application area and which have been installed according to the respective installation instructions. Do not expose the device to any mechanical or thermal loads exceeding that described in the operating instructions

**Risk of injury from overheating of the control head.****Ambient temperature:**

Standard version: 0° ... +55 °C (Max. 95% humidity; non-condensing)

General hazardous situations.

To prevent injuries:

- Ensure that the system cannot be activated unintentionally.
- Installation and maintenance work, as well as operator control actions may be carried out by authorised and qualified technicians only and with the appropriate tools.
- Do not make any unauthorized internal or external changes to the device!
- After an interruption in the electrical or pneumatic supply, ensure that the process is restarted in a defined or controlled manner.
- The device may be installed and operated only when in perfect condition and in consideration of the operating instructions.
- The general rules of technology apply to application planning and operation of the device.

Degree of protection:**Standard version:**

IP67 according to EN 60529

(only if cables, plugs and sockets have been connected correctly, the cap has been sealed correctly and the adaptation to the process valve was done correctly)

7.2. Conformity to the following standards

- Certain variants only of the control head F783 EASYMIND 2.0 comply with the EC directives according to the EC Declaration of Conformity. The applied standards which are used to demonstrate compliance with the Directives are listed in the EC Declaration of Conformity. This may be requested from Pentair Flow TechnologiesPacific Pty. Ltd.
The specifications on the respective rating plate apply to the respective control head. The symbols on the rating plate indicate the applicable directives or approvals:

7.3. Rating plate specifications

PENTAIR F783E 2.0 Digital  24VDC Max Power: 3.0VA P 2.5—7Bar IP67 F783E2.0 24DCP M1SA2PKCBMHV	Pentair Flow Technologies Pty Ltd 12-14 Kaimiro St, Hamilton, 3200 Made in New Zealand
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52mm

37mm

- Line 1
- Line 2
- Line 3
- Line 4
- Line 5
- Line 6
- Line 7
- Line 8

PENTAIR F783E 2.0 Digital NPN  24VDC Max Power: 3.0VA P 2.5—7Bar IP67 F783E2.0 24DCN M1SA2PICGBM--	Pentair Flow Technologies Pty Ltd 12-14 Kaimiro St, Hamilton, 3200 Made in New Zealand
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PENTAIR F783E 2.0 AS-interface 3.0  30VDC Max Power: 3.0VA P 2.5—7Bar IP67 F783E2.0 ASI3.0 M1SA2PKCBMHV	Pentair Flow Technologies Pty Ltd 12-14 Kaimiro St, Hamilton, 3200 Made in New Zealand
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- Line 1
- Line 2
- Line 3
- Line 4
- Line 5
- Line 6
- Line 7
- Line 8

PENTAIR F783E 2.0 D-NET  24VDC Max Power: 3.0VA P 2.5—7Bar IP67 F783E2.0 D-NET M1SA2PKCBH5M	Pentair Flow Technologies Pty Ltd 12-14 Kaimiro St, Hamilton, 3200 Made in New Zealand
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Symbols:	
	Device complies with European standards according to EC Declaration of Conformity
Text lines:	
1	Device designation
2	Type of communication (Digital I/O or network)
3	Operating voltage or type of communication (24V DC, AS-i)
4	Max. power consumption
5	Pressure rating
6	Protection rating
7	Item Code (from selection guide)
8	Item Code (Continued)

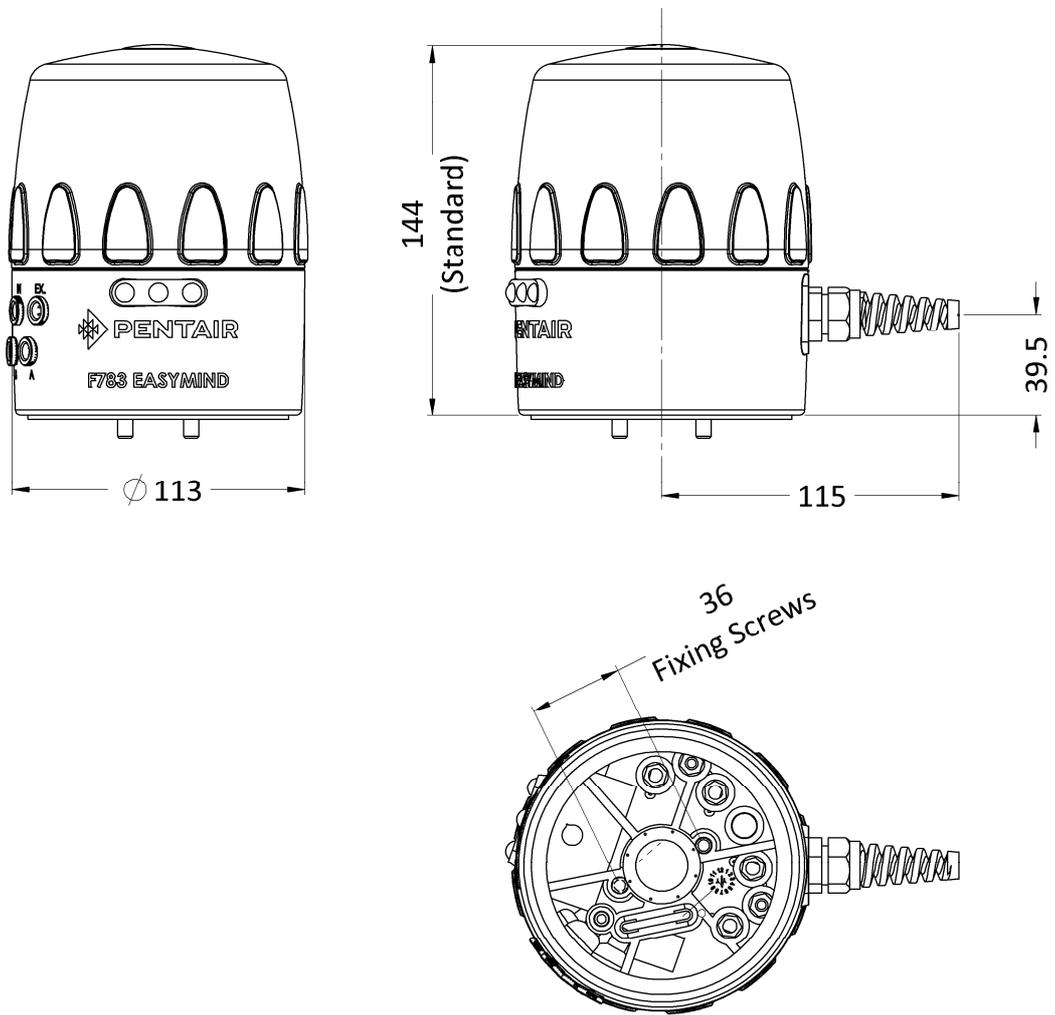
7.4. Mechanical data


Fig. 3: Dimensional drawing – Standard relief valve option

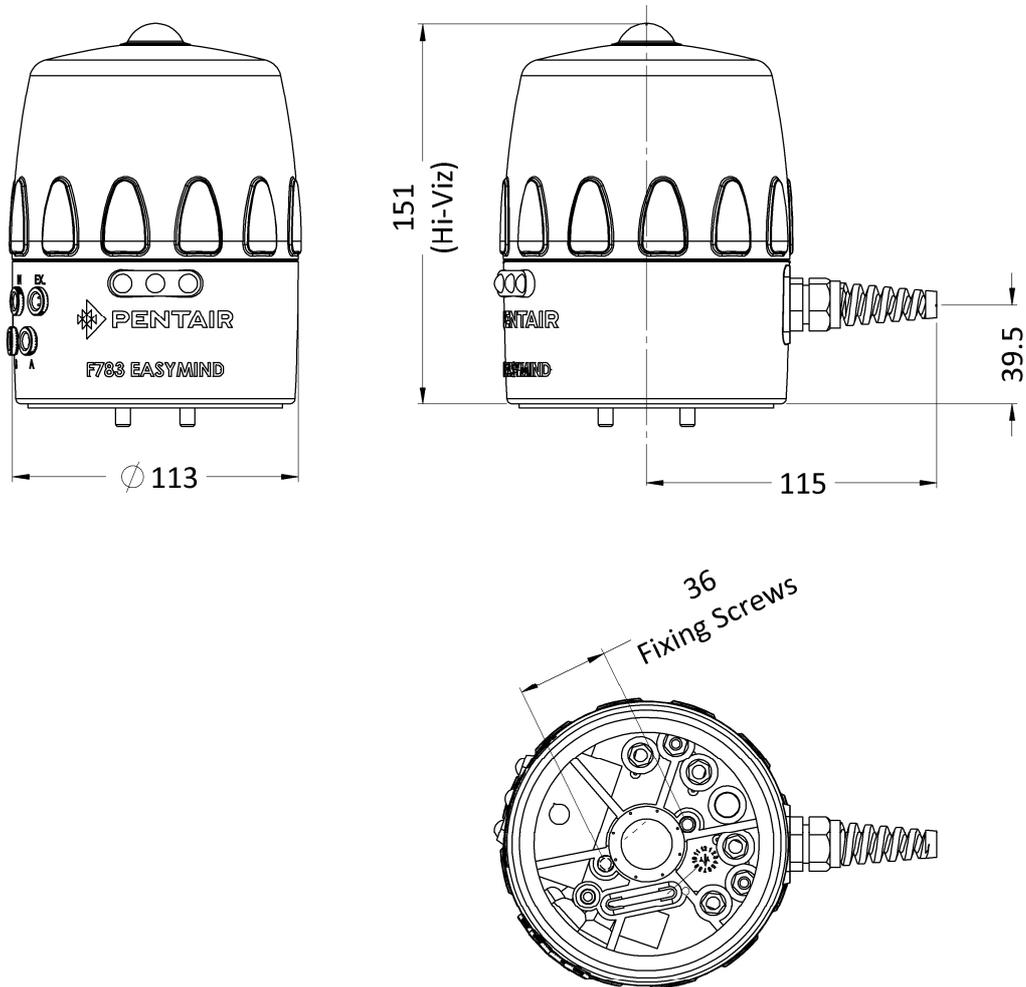
7.4. Mechanical data (Cont'd)


Fig. 4: Dimensional drawing – Hi-Viz relief valve option

Weight:	approx. 0.7 kg
Housing material:	exterior: PA6, GF inside: ABS
Sealing material:	exterior: EPDM (O-rings) Santoprene (gasket) inside: NBR

7.5. Pneumatic data



WARNING!

Use clean dry air

Do not use compressed air which contains chemicals, synthetic oils containing organic solvents, salts or corrosive gases, etc., as this can cause damage or malfunction.



CAUTION!

Install air filter

Install air filters close to valves at their upstream side. A filtration degree of 5 µm or less should be selected.

Install an air dryer, after cooler or Drain Catch (water separator) etc.

Air that includes excessive moisture may cause malfunction of valves and other pneumatic equipment. To prevent this, install an air dryer, after-cooler, or water separator, etc.

If excessive carbon dust is generated

Eliminate it by installing mist separators at the upstream side of valves. If excessive carbon dust is generated by the compressor, it may adhere to the inside of valves and cause malfunction.

Control medium:	Air, neutral gases Quality classes in accordance with DIN ISO 8573-1 (5µm filter recommended)
Dust content Quality class 7:	max. particle size 40µm max. particle density 10mg/m ³
Water content Quality class 3:	max. pressure dew point -20°C or min. 10°C below the lowest operating temperature
Oil content Quality class X:	max. 25mg/m ³
Temperature range of compressed air:	-10 ... +50° (non-condensing)
Pressure range:	2.0 ... 7 bar (minimum air pressure of system may be higher than minimum pressure to operate solenoid, as required by product conditions, valve or actuator)
Connections:	6mm "One touch" push-in fittings, collets and O-rings are replaceable

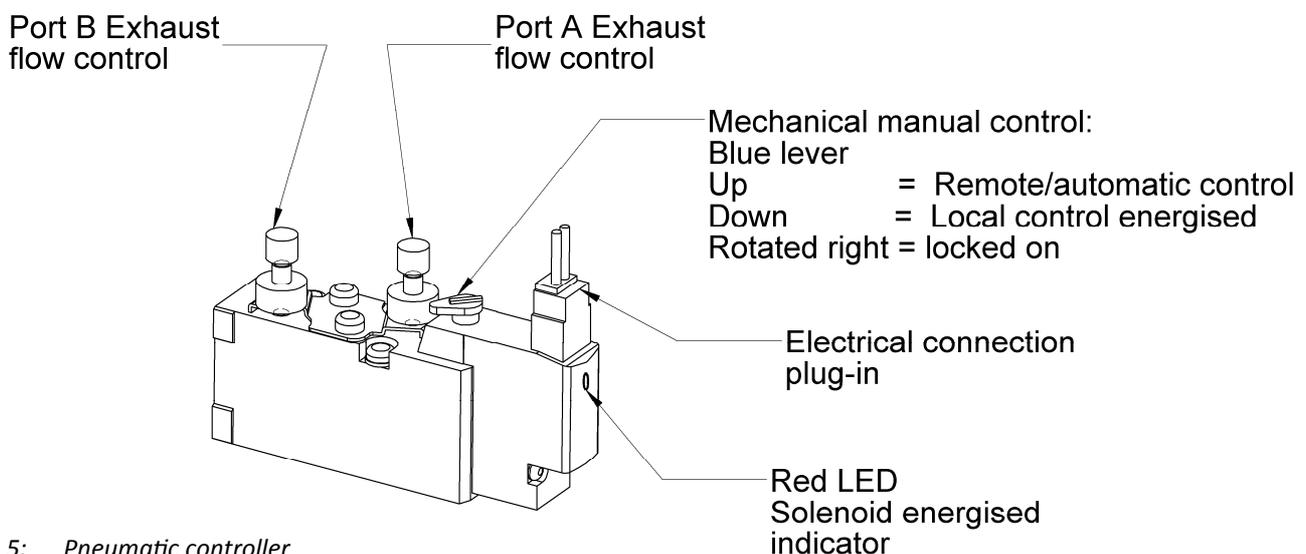


Fig. 5: Pneumatic controller

The exhaust flow rates for both ports can be controlled separately to control the actuator speed in both energising and de-energising directions

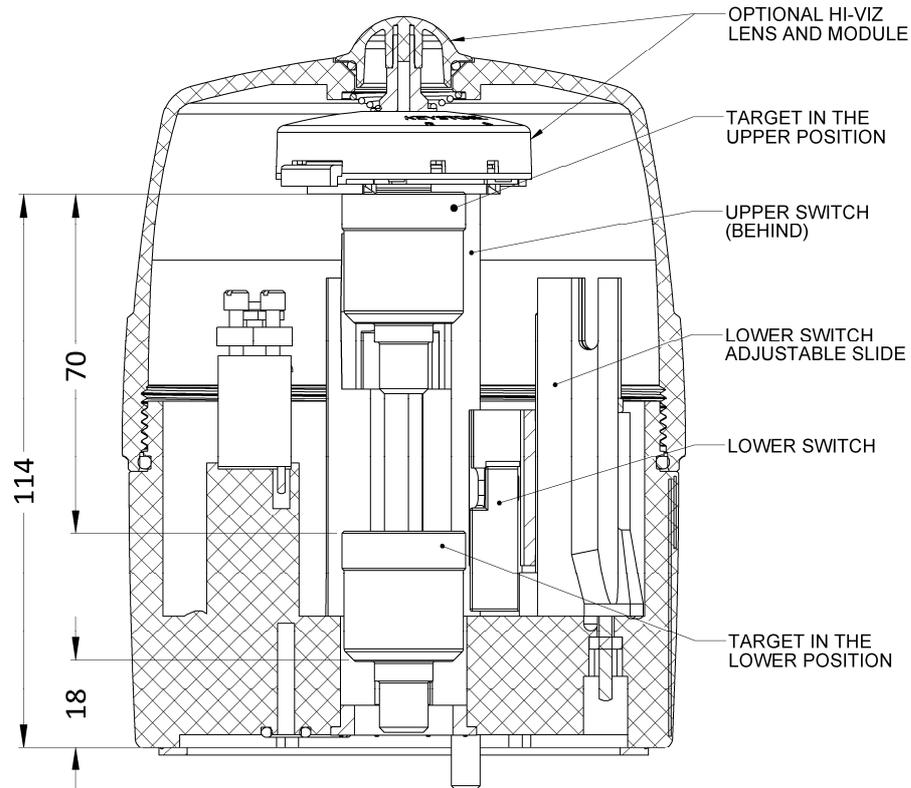
7.6. Position system data


Fig. 6: Section view of control head on linear actuator (target shown in upper and lower position)

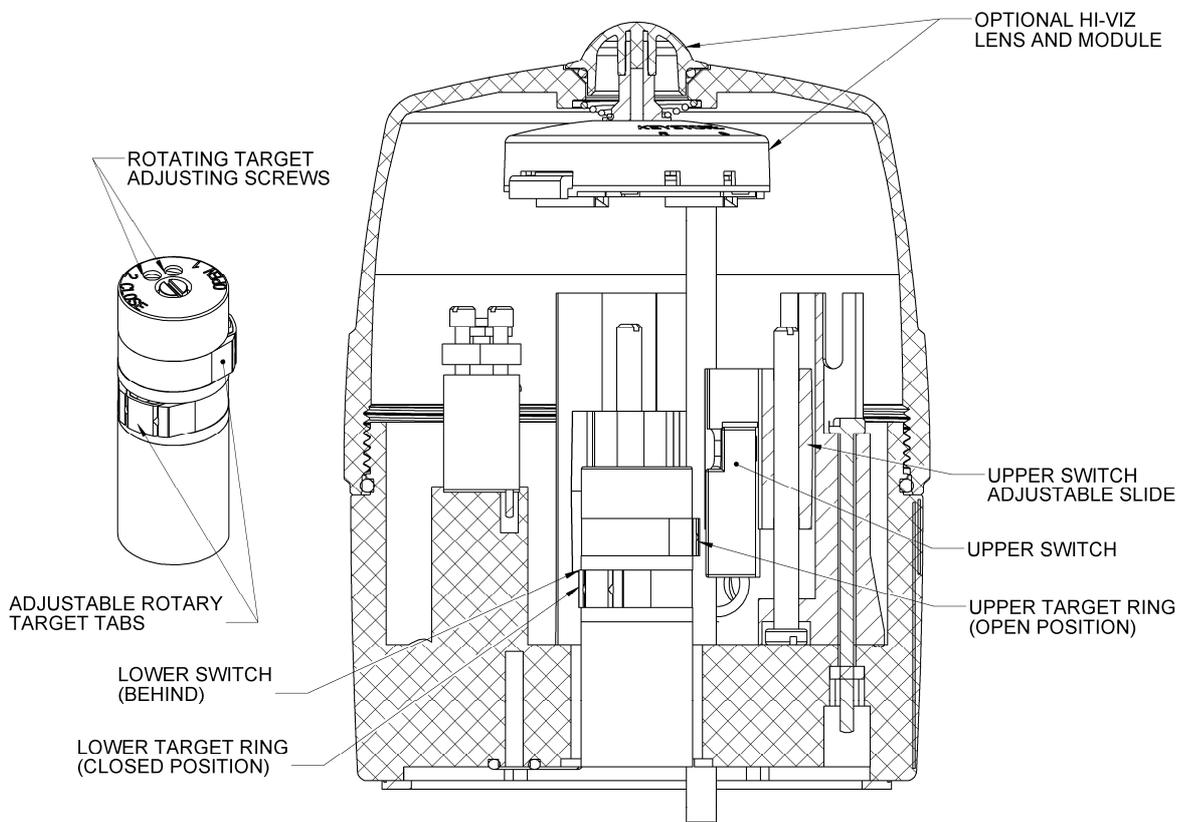


Fig. 7: Section view of control head on rotary actuator.

8. INSTALLATION

8.1. Safety instructions

Always wear the appropriate PPE for the situation. Use correctly sized tools for operations that require tools



DANGER!

Risk of injury from high pressure in the system

- Before loosening any lines and valves turn off the pressure and vent the valves



WARNING!

Risk of injury from overheating of the control head.

- ⇒ Before accessing the inside of the F783E 2.0 control head, isolate any control power which may be hazardous to the health of the operator.
- ⇒ Ensure the control head is safe to work on – secure the system against unintentional activation
- ⇒ Avoid leaving live loose wires which can contact ground or each other and initiate protective devices.
- ⇒ When commissioning and testing the control head, before manually operating the actuator ensure it is safe to do so. Ensure operating the valve won't compromise personal or product safety. Keep hands clear of moving parts at all times.

8.2. Assembly of the control head

The control head can be installed in any installation position. Ensure there is sufficient height above the control head to remove the cap and adjust the switches.

The device should be installed such that layers of dust thicker than 5 mm cannot form; meaning that such should be ensured through correspondingly regular cleaning.

Risk of injury from improper assembly!

Do not improperly stress the control head.

Do not apply any leverage effect on the head and do not climb on it.

For the installation of the F783E control head to a linear-type actuator, you will require an actuator-specific target. Be sure to order the correct target for that actuator.

For installation of the F783E control head on a rotary-type actuator, the target will always be the same. Depending on the type and brand of actuator an adaptor kit may be required.

When mounting the F783E 2.0 control head on a **PENTAIR** brand F257 or F272S actuator no special mounting adaptor is required.

8.2.1. Mounting the base

NOTE!

- **Maximum supply cable length is to be 30m. Control top must be installed in the same building as the control cabinet.**
- **Installation environment and wiring are influential on the module's EMC: Thus the installer must secure EMC of the whole device.**
- **According to Norm EN 61326-1: 2006 (chart 2) DC supply connections to the module are treated as input/output signal lines. For cable lengths greater than 30 m and outdoor applications additional measures must be implemented in order to comply with CE**

8.2.1.1. Fitting the control head—Linear actuator

If installing on the F272S actuator, remove and discard the metal O-Ring retaining plate/cover. Fit the O-Ring retaining bush (supplied with the actuator) over the actuator shaft, small diameter uppermost, to secure the actuator shaft O-Ring.

1. Fit the linear target assembly to the shaft of the piston valve actuator. Tighten using a Hex key.
2. The height of the switches have been factory set to operate when used on a F257 1/4 turn actuator, so the Open switch, which is opposite the **solenoid**, must be inverted in order to achieve sufficient height adjustment. To do this turn the switch tower adjusting screw clockwise until the switch carrier is flush with the top of the screw. Press the switch downwards firmly until it releases from the clips, turn it so the target area is uppermost and refit it to the clips (see Limit Switch Setting below for adjustment procedure).
3. Locate the Base Gasket on to the step on the top of the actuator or mounting kit adaptor.
4. Fit the two Base O-Rings into the round & oval recesses in the base of the control head, the larger O-Ring is supplied round and will need to be worked into its oval recess. DO NOT apply grease, the O-Rings will be easier to fit and keep in place if kept dry and not lubricated.
5. Fit the control head over the target assembly onto the actuator or adaptor plate. Check any mounting holes do not foul the Base O-Rings while orienting the air ports towards the actuator air ports.
6. Fasten the Control Head down by means of the two M6 socket head cap screws. Torque down to 3.5 NM. Do not over tighten.
7. Connect the air lines from the actuator to the control head to suit the actuator and valve combination. Port “B” is live when the solenoid is de-energised, the “A” port is live when the solenoid is energised.
8. Connect the air supply to the Control Head port labelled “IN”. If it is safe to do so the actuator can be operated using the manual override on the solenoid. Check for leaks.
9. Fit the cable gland and tighten firmly using an appropriate spanner.

8.2.1.2. Limit Switch Setting

This procedure is simplified if the control head is connected to a power source, as the LED’s on the switches and module will indicate. It is best to adjust the switches such that the target is just coming into the switch detection zone.

1. Operate the valve to the fully OPEN (up) position by operating the manual override switch on the solenoid.
2. Using a small flat blade screwdriver adjust the switch opposite the **solenoid** by turning the height adjustment screw, clockwise raises the switch, anticlockwise lowers the switch. If power is not available align the centre of the target symbol on the switch with the middle of the metal target.
3. Operate the valve to fully closed (down) position. Adjust the switch opposite the **module** by turning the height adjustment screw.
4. Release the manual override if used, before fitting the Cap O-Ring and screwing the Cap firmly down.

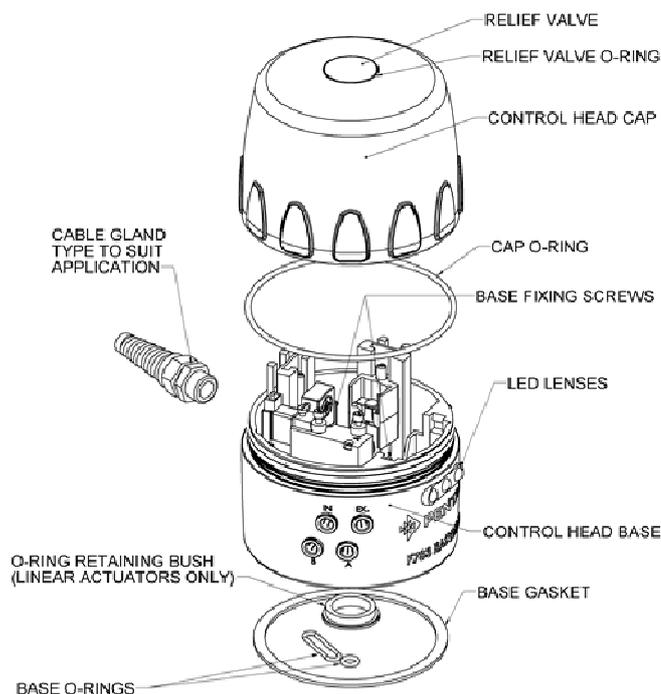


Fig 8. Mounting - Linear Components

8.2.1.3. Fitting the control head—Rotary actuator

1. Secure the rotary target assembly to the indicator shaft of the F257 ¼ turn actuator or actuator mounting kit. Ensure the grub screw (set screw) locates into the dimple provided on the drive flat.
2. Locate the rubber base gasket on to the step on the top of the actuator or mounting kit adaptor.
3. Fit the two O-rings into the round & oval recesses in the underside of the base of the control head, the larger O-ring will need to be worked into its recess. It is better NOT to apply grease, the O-ring will be easier to fit and keep in place if not lubricated.
4. Fit the control head over the target assembly onto the actuator, ensuring the O-rings in the base of the head line up with the internal air porting in the top of the actuator. When the control head is being fitted to any actuator other than the F257 ¼-turn, the external air porting is used and the adaptor will blank off these ports. Check any mounting holes do not foul the O-rings.
5. Fasten the head down by means of the two M6 socket head cap screws. Torque down to 3.5 NM. Do not over tighten.
6. Fit the two plugs supplied with the rotary target assembly into ports 'A' & 'B' in the control head.

Note: When the control head is used in an application other than the internally ported F257 actuator, Port B is "live" when the solenoid is De-energised, and Port A is "live" when the solenoid is Energised.

8.2.1.4. Limit Switch and Rotary Target Setting

Setting the switch height:

The height of the switches have been factory set for use on the F257 ¼-turn actuator. If the control head is fitted to another actuator the switch heights may need to be adjusted to suit the target height. The switch to indicate the open position is opposite the module, the switch to indicate closed is opposite the solenoid. The target area of the switches (the crosshairs) should line up with the metal target cams.

To adjust the switch height, turn the adjusting screw (through the switch holder) to raise or lower the switch.

Setting the target cams:

1. Operate the actuator to the fully open position, using the manual solenoid control button.
2. Slacken the central screw (slotted head screw) on the rotary target assembly one full turn.
3. Adjust the top cam by turning the adjusting screw marked 'OPEN' with a small flat blade screwdriver so the target is lined up with the centre of the switch.
4. Operate the actuator to the fully closed position
5. Adjust the bottom cam by turning the adjusting screw marked 'CLOSED' using the screwdriver so the target is lined up with centre of the switch.
6. After setting the cams, re-tighten the central clamping screw firmly and check that the switch setting is as required.
7. The above procedure is made simpler if the control head module is connected to the power source as you will see the position LED's working.
8. If necessary adjust the solenoid valve speed controls to control the opening and closing speed of the actuator. Make sure they are locked off properly before closing up.

8.2.2. Pneumatic and electrical connections

Pneumatic installation

See Chapter "10. Pneumatic Installation"

Electrical installation

24 V DC: see Chapter "11. 24 V - Design"

AS-Interface: see Chapter "12. AS Interface - Design"

Recommended auxiliary materials

ROCOL Sapphire Silicone grease for lubrication of the control head cap thread and O-ring seal. Alternatively use Klüber Paraliq GTE 703.

9. OPENING AND CLOSING THE HOUSING

9.1. Safety instructions

**DANGER!****Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)**

Opening the control top in an explosive atmosphere is only allowed in a non-energised state

Use only cables and cable glands which have been approved for the respective application area and which have been installed according to the respective installation instructions. Do not expose the device to any mechanical or thermal loads exceeding that described in the operating instructions

**DANGER!****Risk of injury from high pressure in the system**

- Before loosening any lines and valves turn off the pressure and vent the valves

**WARNING!****Risk of injury due to electric shock!**

Before opening the control head and prior to reaching into the system assess the risk from accidental contact with live conductors.

Observe applicable accident prevention and safety regulations for electrical equipment!

Risk of injury from improper installation!

Installation may be carried out by authorized technicians only and with the appropriate tools!

Risk of injury from unintentional activation of the system and uncontrolled restart!

Secure system against unintentional activation.

Following installation, ensure a controlled restart.

9.2. Opening and closing the housing

NOTE!**Improper handling will damage the plastic cap or sealing o-ring!**

Do not use excessive force (e.g. by knocks) for opening. Hand grips are provided to assist removing and replacing the cap. In severe cases a strap wrench may be used.

9.2.1. Opening the housing

Procedure:

- Unscrew the cap by rotating in an anti-clockwise direction.

9.2.2. Closing the housing

If required clean all sealing faces and check for damage to threads and sealing surfaces.

- Make sure that the seal face is clean and not damaged when the cap is fitted as this might reduce the IP protection!
- Ensure all wires are in the appropriate wire restraints so none can be caught in the threads and potentially damaged.
- Ensure no cables are interfering with the relief valve mechanism in such a manner as to allow the ingress of water or jamming the relief valve which could result in a build-up of pressure in the enclosure.

Procedure:

- Lightly lubricate the O-ring sealing face on the cap and the cap thread with a silicone-based lube such as ROCOL Sapphire Silicone or Klüber Paraliq GTE 703
- Place the cap over the interior components, ensuring no wires are caught in the thread.
- Twist the cap in an anti-clockwise direction until hearing a click, this will indicate the thread start, now rotate in a clockwise direction until the cap is securely tightened. There should be minimal O-ring showing at the cap/base interface, and the relief valve should be seated properly on the top of the cap. If the relief valve is raised, remove the cap and check the relief valve is operating properly and no internal components are interfering with the operation of the relief valve mechanism. Refit the cap.

10. PNEUMATIC INSTALLATION

10.1. Safety instructions


DANGER!

Risk of injury from high pressure in the system

- Before loosening any lines and valves turn off the pressure and vent the valves


WARNING!

Risk of injury from improper installation!

- Installation may be carried out by authorized technicians only and with the appropriate tools!

Risk of injury from unintentional activation of the system and uncontrolled restart!

- Secure system against unintentional activation.
- Following installation, ensure a controlled restart.

10.2. Pneumatic connections of the control head


DANGER!

Risk of injury from high pressure in the system

- Before loosening any lines and valves turn off the pressure and vent the valves

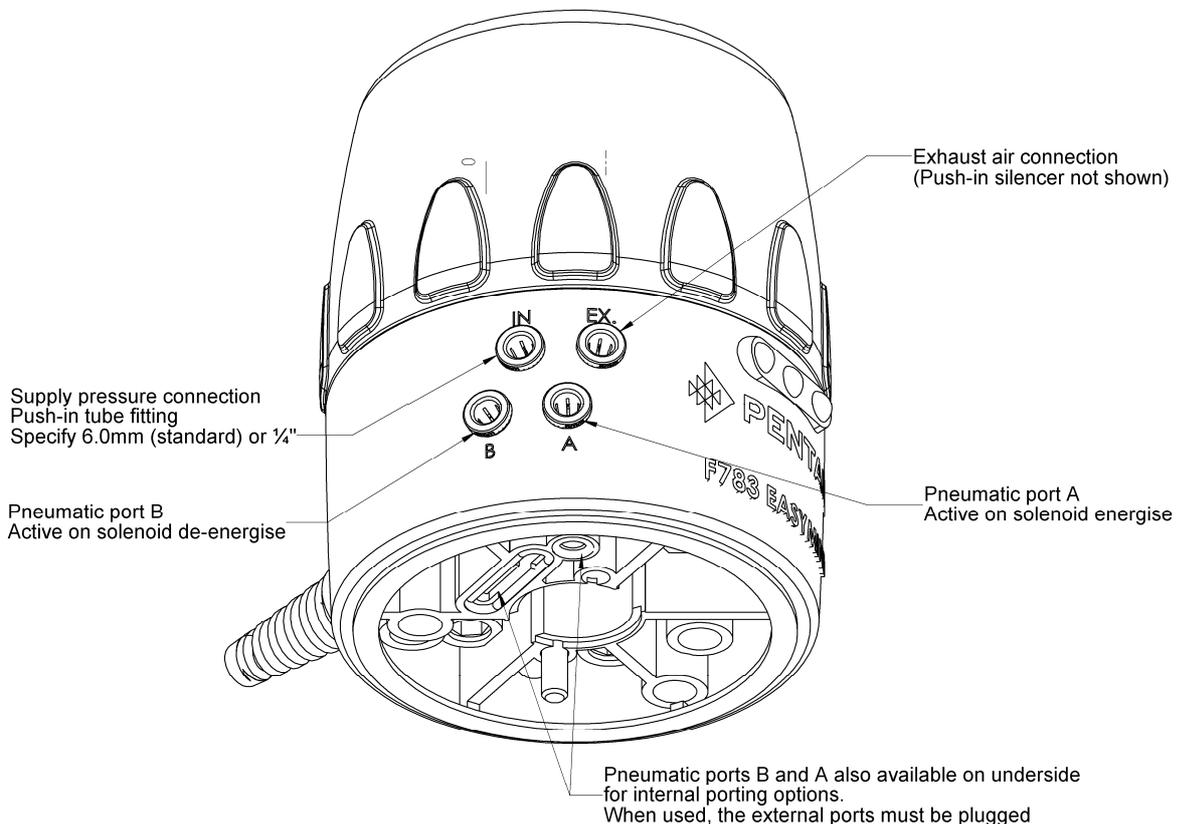


Fig 9. Pneumatic connections

Procedure

The control head can be positioned in two orientations with respect to the actuator, as set by the two mounting bolts that retain the control head onto the actuator or adaptor.

- ⇒ In the case of the F257 rotary actuator, only one position will allow the use of the internal porting facility. The other position will blank the internal ports.
- ⇒ In the case of a linear actuator choose the orientation that is most convenient for the routing of the airlines from the control head to the actuator control ports.

The exhaust is fitted with a silencer on leaving the factory. If required this can be replaced with an exhaust airline by removing the exhaust silencer from the one-touch fitting and installing an airline of the correct size. The default size for the F783E 2.0 is 6mm air tube, see the Product Selection Guide on page 9 for options.

NOTE!

- ⇒ Use only airlines of the correct size for the fittings installed. If in doubt, the size of the airline is imprinted on the air fitting collet.
- ⇒ Always use a hose cutter designed for the air tube. Scissors, saws and knives are not suitable hose cutters.
- ⇒ Allow sufficient length on airlines to avoid kinking of the tube, or tension on the fitting. Either will lead to premature failure of the airline, and possible injury or product loss.
- ⇒ Always use an airline of the required quality to suit the environment.
- ⇒ If using an exhaust airline, ensure the length and bore of the airline do not restrict the flow from the actuator to exhaust.

10.3. Flow restriction function of the solenoid valve

- ⇒ Set the flow restriction function of the solenoid valve only when required and after completion of all necessary installation.

The flow restriction screws on the solenoid valve are used to control the rate of flow from the exhaust of the two sides of the cylinder.

Once the desired flow rate has been set tighten the locking nuts to prevent the screws moving during operation

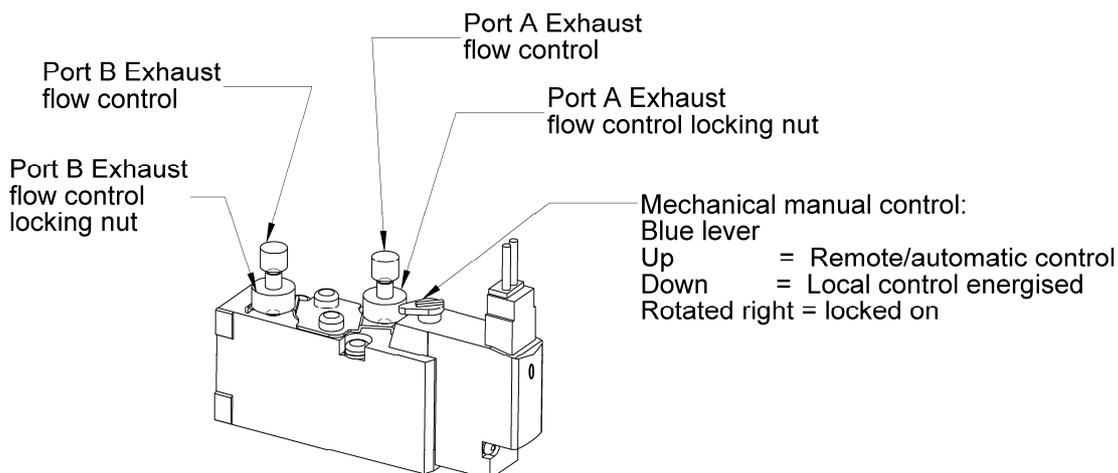


Fig 10: Setting the exhaust flow restrictors

Once the flow screws are set, close the housing in accordance with the instructions in Chapter 8 “Opening and closing the control head”

11. 24V DESIGN

11.1. Electrical connection options—Non-Ex implementation

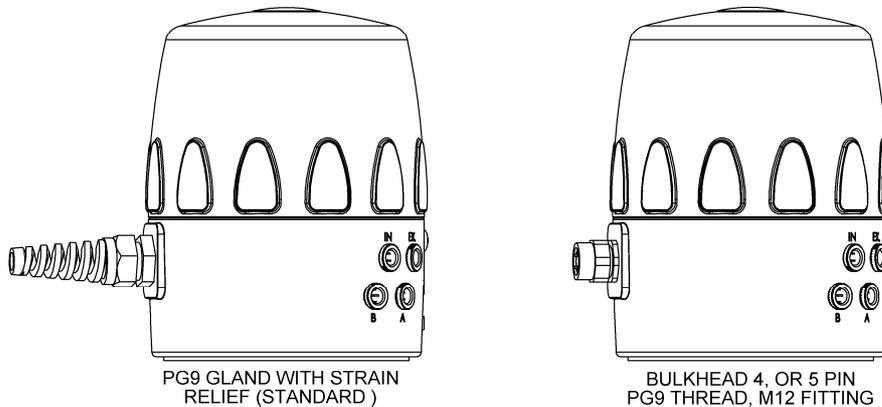


Fig 11: Electrical connection options

11.2. Electrical data

Power supply: 22 ... 28 V DC, residual ripple 10 %
20 ... 28 V AC

Connections:

Cable gland version: 1 x PG9 cable gland c/w strain relief for power supply and signals, for cable diameter 3.5—8 mm,
Bulkhead connector: 1 x PG9 threaded socket (M12 plug according to IEC 61076-2-101, 4 pole)

Power consumption (mA):

	Standby	1 switch ON	1 switch ON + Solenoid energised
24VDC PNP or NPN	<1	30	60
24VAC	<1	30	70

Position sensors:

- DC 3-wire Inductive Proximity switch, PNP.
- DC 3-wire Inductive Proximity switch, NPN.
- AC 2-wire Inductive Proximity switch.

Connected to 3-pin headers with latching plugs.

NOTE!

- Maximum supply cable length is to be 30m. Control top must be installed in the same building as the control cabinet.
- Installation environment and wiring are influential on the module's EMC: Thus the installer must secure EMC of the whole device.
- According to Norm EN 61326-1: 2006 (chart 2) DC supply connections to the module are treated as input/output signal lines. For cable lengths greater than 30 m and outdoor applications additional measures must be implemented in order to comply with CE

NOTE!**The Producer/Consumer model**

- The F783E 2.0 control module can be considered as having both Inputs and Outputs in both directions, that is both upstream and downstream from the module. To reduce confusion this document refers to the producer/consumer model for information transfer. In this model the F783E Module CONSUMES data from the control system or network (i.e., controls the solenoid) and PRODUCES data for the control system (sends the state of the position switches back to the control system).
- In this respect the control of the solenoid is considered as an Output and the feedback from the switches is considered an Input. The connections between the control system and the module are agnostic, and ignored.

Outputs: 1 output via 2-pin header, normally supplied with a cable set with latching plug both ends to suit pilot valve

DC Inputs: Two clean switch inputs from 3-wire inductive proximity switches, one each for the open and closed position.

AC Inputs: Two load derived switch inputs from 2-wire inductive proximity switches, one each for the open and closed position. There is a leakage current associated with these switches which must be allowed for when specifying PLC input equipment. Maximum leakage at 24V is <1mA. When ON these switches will supply a minimum of 5mA.

11.3. Safety instructions

**DANGER!****Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)**

Opening the control top in an explosive atmosphere is only allowed in a non-energised state
Use only cables and cable glands which have been approved for the respective application area and which have been installed according to the respective installation instructions. Do not expose the device to any mechanical or thermal loads exceeding that described in the operating instructions

**WARNING!****Risk of injury due to electric shock!**

- Before reaching into the system isolate the power supply when it is deemed the power supply could be capable of causing injury from electric shock!
- Observe applicable accident prevention and safety regulations for electrical equipment!

Risk of injury from improper installation!

- Installation should only be carried out by qualified personnel and only with the appropriate tools

Risk of injury, product loss or damage from unintentional activation of the system and uncontrolled operation of the output!

- Secure the system against unintentional activation
- Following installation ensure a controlled restart

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

11.4. Electrical installation and startup

11.4.1. Cable gland with screw terminals

Procedure:

- ⇒ Open the control head (follow the instructions in chapter 8 “Opening and closing the housing” if in doubt)
- ⇒ Prepare the cable by stripping back the insulation to expose approximately 120mm of the cores. Strip each core to expose 8 to 10mm of bare copper.
- ⇒ Insert the cable through the cable gland until the outer sheath is able to be secured by tightening the gland
- ⇒ Twist each core firmly and fold in half before fitting to the terminals of the 6-way header plug, the correct location for each core is printed on the rear of the module, as below in Fig 12.
- ⇒ Tighten the terminal screws.
- ⇒ Close the housing (follow the instructions in chapter 8 “Opening and closing the housing” if in doubt)

CONN#1	24VDC	24VDC	24VAC
6-WAY PLUG	PNP	NPN	
1	+24V	0V	24V Phase
2	0V	+24V	Neutral
3	Closed Ind	Closed Ind	Closed Ind
4	Open Ind	Open Ind	Open Ind
5	Solenoid ±	Solenoid ±	Solenoid ±
6	Solenoid ±	Solenoid ±	Solenoid ±

CONN#2 & 3	24VDC	24VDC	24VAC
3-WAY PLUG	PNP	NPN	
1	0V	+24V	
2	+24V	0V	24V Phase
3	Feedback	Feedback	Feedback

CONN#4	24VDC, 24VAC
2-WAY PLUG	PNP, NPN, AC
1	Solenoid supply (polarity not critical)
2	Solenoid supply (polarity not critical)

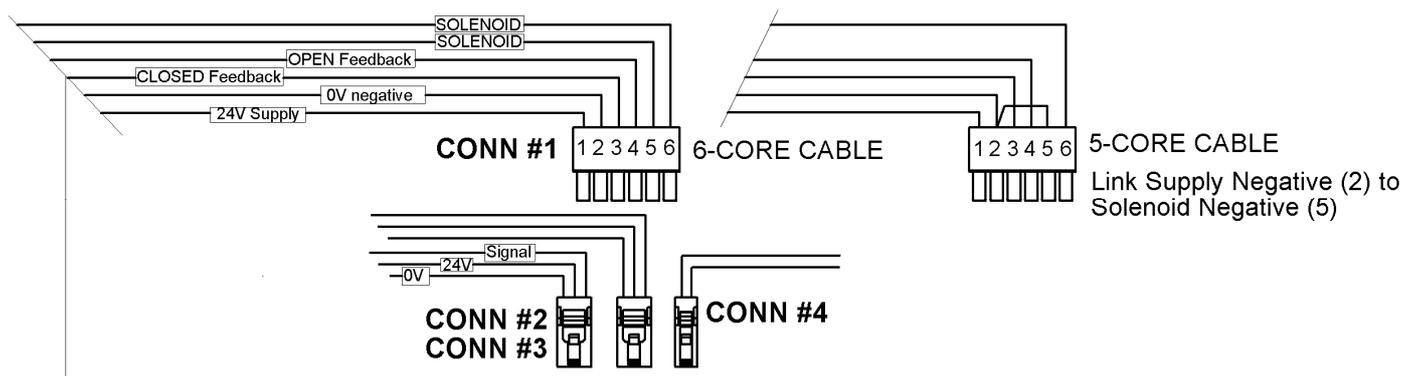


Fig 12: DC Electrical connection screw terminals, example PNP connection

NOTE!

Ensure IP protection is maintained!

- To ensure the control head IP rating is maintained the cable gland nut must be tightened securely, the cap O-ring must be in good condition and in place and the relief valve must be fitted correctly and its O-ring in place.
- All unused air connections should be fitted with a sealing plug

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

11.4.2. Bulkhead connection

In the case of a control head supplied with a bulkhead connector fitted, the internal cabling will already have been carried out according to Fig 13 below.

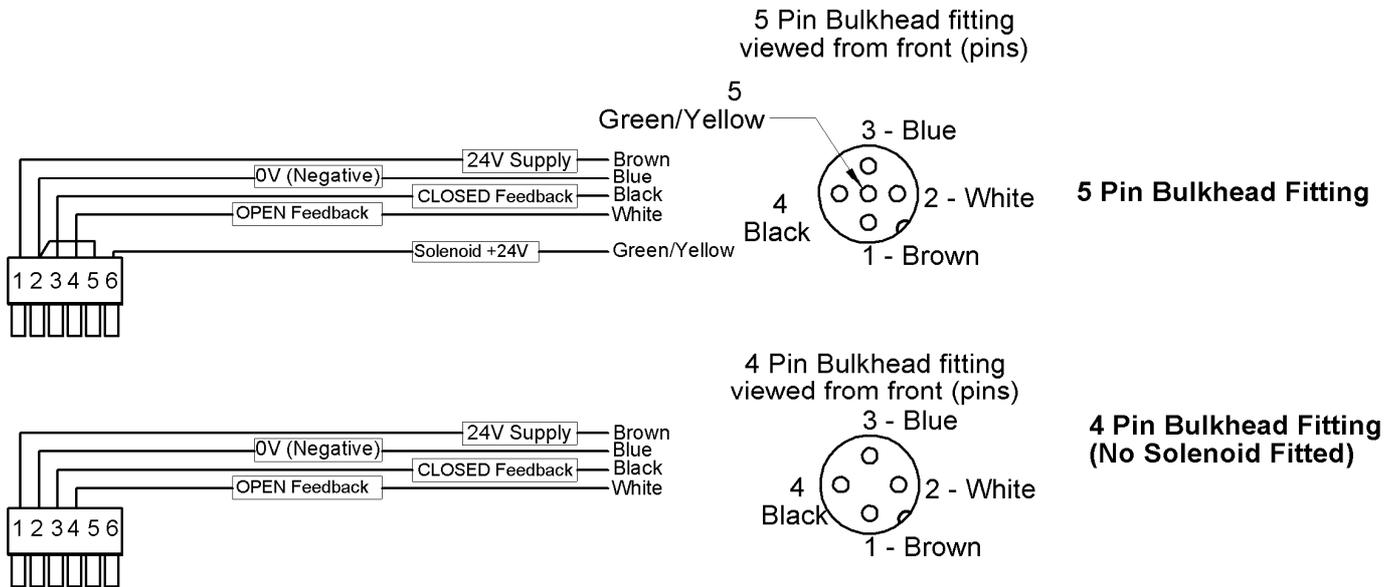


Fig 13: DC Electrical connection bulkhead plug, example PNP connection

12. AS INTERFACE - DESIGN

12.1. Definition

AS interface connection

AS interface (Actuator Sensor Interface) is a field bus system which is used primarily for networking binary sensors and actuators (slaves) with a higher-level controller (master).

! Connecting the control heads to higher bus systems is possible using commercially available gateways. Contact your customer services representative for more information.

Bus line:

Power and data transmitted on a two-wire unshielded cable

Network topology:

Freely selectable within wide limits. AS-interface can use star or dropline topology or a mixture of both. Bus length limits depend on the equipment employed, but the nominal limit of 100m* can be increased if using active bus termination and bus repeaters. The F783E control head module for AS-i uses extended addressing to achieve 62 slaves (A/B addressing) and is designed to be compatible with the AS-i specification 3.0, and is fully backward compatible to AS-i 2.1. it can optionally programmed to operate with standard addressing for 31 slaves.

* NOTE!

- **Maximum supply cable length is to be 30m. Control top must be installed in the same building as the control cabinet.**
- **Installation environment and wiring are influential on the module's EMC: Thus the installer must secure EMC of the whole device.**
- **According to Norm EN 61326-1: 2006 (chart 2) DC supply connections to the module are treated as input/output signal lines. For cable lengths greater than 30 m and outdoor applications additional measures must be implemented in order to comply with CE**

12.2 Electrical connection options —Non-Ex implementation

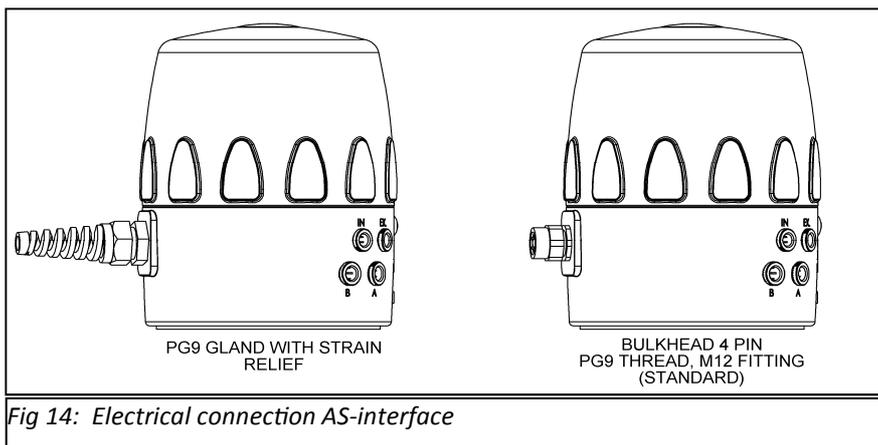


Fig 14: Electrical connection AS-interface

12.3. Electrical data

Power supply: As mandated by the AS-interface protocol, 30VDC, protected and filtered. Use only certified AS-i power supplies

Maximum Load: AS-I network cable is rated to 4 Amps or 8 Amps, check the installation for which is installed.

Connections:

Bulkhead connector: 1 x PG9 threaded socket (M12 plug according to IEC 61076-2-101, 4 pole)

Cable gland version: 1 x PG9 cable gland c/w strain relief for power supply and signals, for cable diameter 3.5—8 mm

External power supply: 19.2VDC to 31.6VDC. The power supply unit must include a secure disconnection in accordance with IEC 364-4-41. it must conform to the SELV standard. The ground potential must not have a ground connection.

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

Power consumption at 29.5V (mA):

	Standby	1 switch ON	1 switch ON + Solenoid energised
AS-I Bus power	12	35	63.5
External Power (Bus load)	12	34	55

Position sensors:

3-wire Inductive Proximity switch, PNP. Connected to 3-pin headers with latching plugs.

Outputs: Up to 3 outputs are able to be controlled from a single module. These have a common 24VDC power supply and ground. These outputs are mapped to bits 0, 1, and 2 of the data byte

Inputs: Two position switch feedback signals are available. See data mapping in Fig 15 below

CONN#1	Function	CONN#2 & 3	24VDC	CONN#4	
6-WAY PLUG		3-WAY PLUG	PNP	4-WAY PLUG	
1	+24V Supply (link to 3)	1	0V	1	Solenoid 2 control
2	0V (link to 4)	2	+24V	2	Solenoid common supply
3	+24V Input	3	Feedback	3	Solenoid 1 control
4	0V Input			4	Solenoid 3 control
5	AS-i + (Brown)				
6	AS-i - (Blue)				

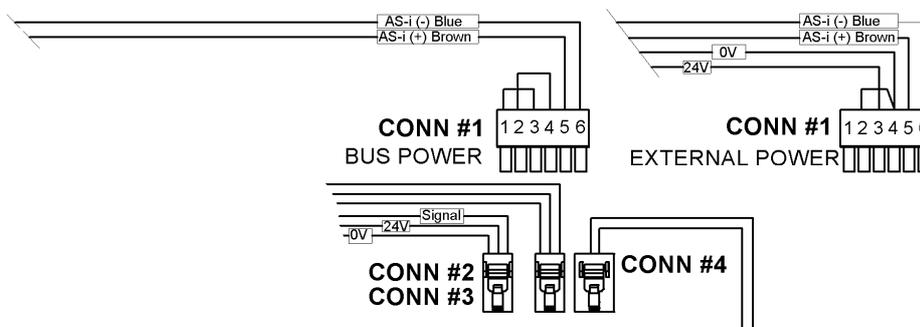


Fig 15: Electrical connection AS-interface

NOTE!
The Producer/Consumer model

- The F783E control module can be considered as having both Inputs and Outputs in both directions, that is both upstream and downstream from the module. To reduce confusion this document refers to the producer/consumer model for information transfer. In this model the F783E Module CONSUMES data from the control system or network (i.e., controls the solenoid) and PRODUCES data for the control system (sends the state of the position switches back to the control system).
- In this respect the control of the solenoid is considered as an Output and the feedback from the switches is considered an Input. The connections between the control system and the module are agnostic, and ignored.

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

12.4. Safety instructions



DANGER!

Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)

Opening the control top in an explosive atmosphere is only allowed in a non-energised state

Use only cables and cable glands which have been approved for the respective application area and which have been installed according to the respective installation instructions. Do not expose the device to any mechanical or thermal loads exceeding that described in the operating instructions



WARNING!

Risk of injury due to electric shock!

- Before reaching into the system isolate the power supply when it is deemed the power supply could be capable of causing injury from electric shock!
- Observe applicable accident prevention and safety regulations for electrical equipment!

Risk of injury from improper installation!

- Installation should only be carried out by qualified personnel and only with the appropriate tools

Risk of injury, product loss or damage from unintentional activation of the system and uncontrolled operation of the output!

- Secure the system against unintentional activation
- Following installation ensure a controlled restart

12.5. Electrical installation and startup AS-interface

12.5.1. Bulkhead connector

⇒ Generally the AS-interface control head will be supplied with all internal cabling completed. There will be no need to change any portion of the internal connections in this case. In this case simply connect the bus system to the control head using the M12 screw-on connector on the bulkhead fitting.

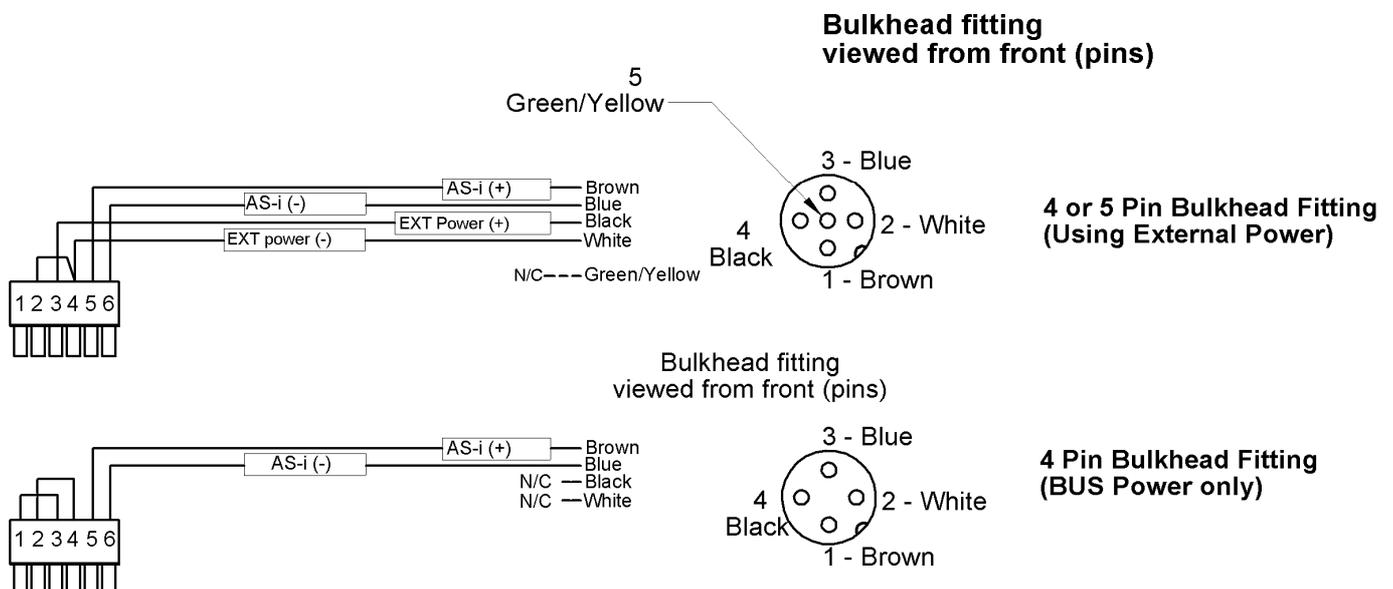


Fig 16: Electrical connection AS-interface bulkhead plug

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

12.5.2. Cable gland with screw terminals

Procedure:

- ⇒ Open the control head (follow the instructions in chapter 8 “Opening and closing the housing” if in doubt)
- ⇒ Prepare the cable by stripping back the insulation to expose approximately 120mm of the cores. Strip each core to expose 8 to 10mm of bare copper.
- ⇒ Insert the cable through the cable gland until the outer sheath is able to be secured by tightening the gland
- ⇒ Twist each core firmly and fold in half before fitting to the terminals of the 6-way header plug, the correct location for each core is printed on the rear of the module, as below in Fig 17.
- ⇒ Tighten the terminal screws
- ⇒ Close the housing (follow the instructions in chapter 8 “Opening and closing the housing” if in doubt)

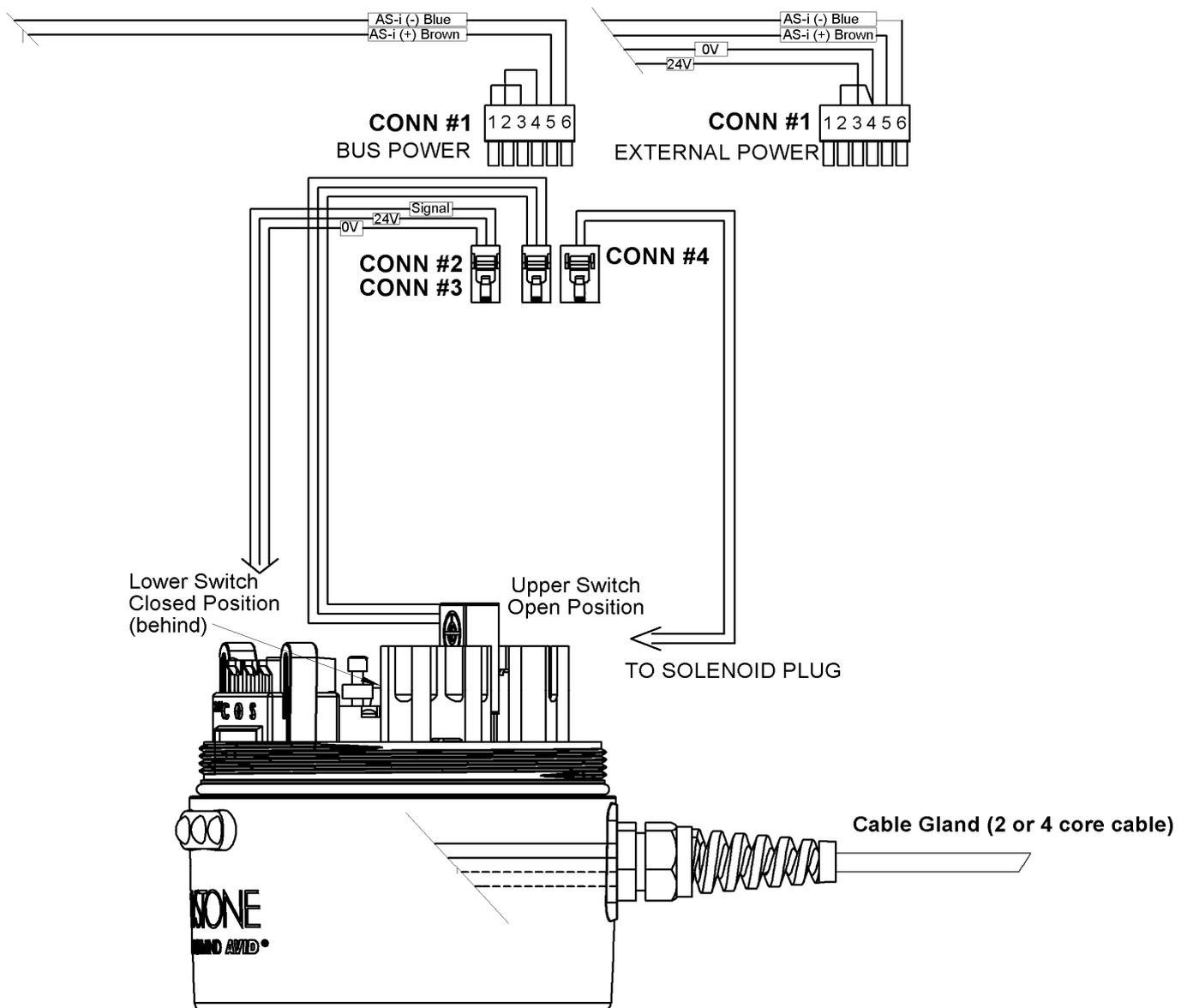


Fig 17: Electrical connection AS-interface cable gland

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

12.5.3. Electronic module LED indicators

Input/ output indicators:

The AS-i module has three large LED indicator on the front. From left to right:

Red LED indicating the Closed switch is activated

Green LED, indicating the open switch is activated

Amber LED, indicating the Output 0 has been activated

Two smaller indicators are also on the front, each one indicating, from left to right, output 2 and 1 is activated.

System Fault indicator

On the top of the module is the system FID indicator. This is used for system diagnostics as below:

Off	Flashing	On steady
System OK, device is connected and running	Device at address 0	Device address not 0, but not registered in
System is powered off		Device is connected but power jumpers

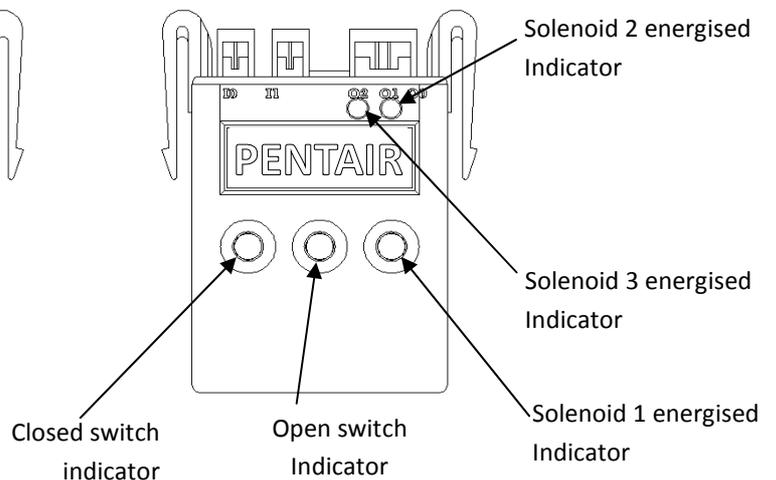
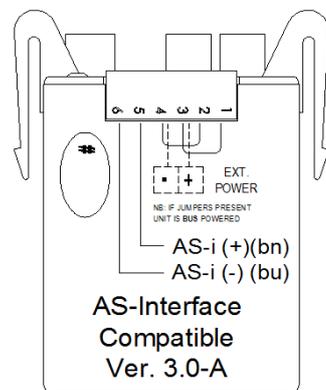
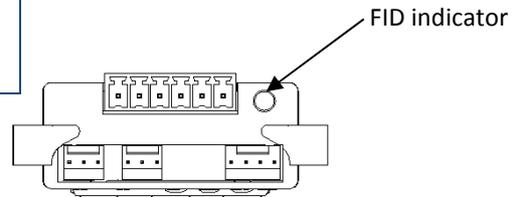


Fig 18: Electronic module LED indicators AS-i

12.6. Programming data

12.6.1. Device profile

The F783E AS-i module data table below describes how the networks interacts with the device:

I/O Configuration	0x7
ID Code	0xA
Extended ID Code 1	0
Extended ID Code 2	0XE

12.6.2. Data Bit configuration table

	D3	D2	D1	D0
Input	Not used	Not used	Open switch activated	Closed switch activated
Output	Not used	Output 2	Output 1	Solenoid

12.6.3. Parameter Bit table

Data bit	P3	P2	P1	P0
Output	Not used	Not used	Not used	Not used

13. DeviceNET - DESIGN

13.1. Definition

DeviceNet is an open network system used in the automation industry to interconnect control devices for data exchange. It utilizes the Common Industrial Protocol over a Controller Area Network media layer and defines an application layer to cover a range of device profiles. The protocol is standardised under IEC 62026-3.

! Connecting the control heads to higher bus systems is possible using commercially available gateways. Contact your customer services representative for more information.

Bus line:

Power and data transmitted on a certified standards-defined four-wire shielded cable

Network topology*:

Tightly defined trunkline/dropline topology, with specified maximum cable lengths according to the cable type. Two kinds of cable, “thick” and “thin”. Data bit rates from 125Kbit/s, 250Kbit/s and 500Kbit/s with maximum cable lengths 500m, 250m and 100m respectively. Trunkline/dropline cable budgets are strictly proscribed and must be followed.

The F783E control top module for D-NET is shipped with MACID (module address) set to 63.

*** NOTE!**

- **Maximum supply cable length is to be 30m. Control top must be installed in the same building as the control cabinet.**
- **Installation environment and wiring are influential on the module’s EMC: Thus the installer must secure EMC of the whole device.**
- **According to Norm EN 61326-1: 2006 (chart 2) DC supply connections to the module are treated as input/output signal lines. For cable lengths greater than 30 m and outdoor applications additional measures must be implemented in order to comply with CE**

13.2 Electrical connection options —Non-Ex implementation

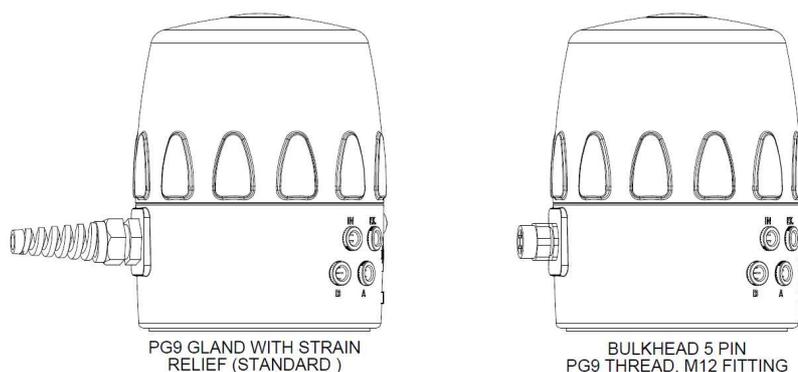


Fig 19: Electrical connection D-NET

13.3. Electrical data

Power supply: As per DeviceNET standard, 11— 25VDC, protected and filtered.
Maximum Load: DeviceNET trunkline cable is rated to 8 Amps, check cable lengths are within budget.

Connections:

Bulkhead connector: 1 x PG9 threaded socket (M12 plug according to IEC 61076-2-101, 5 pole)
 Cable gland version: 1 x PG9 cable gland c/w strain relief for power supply and signals, for cable diameter 3.5—8 mm

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

Power consumption at 24V (mA):

	1 switch ON	1 switch ON + Solenoid energised
D_NET Power	34	44

Position sensors: 3-wire Inductive Proximity switch, PNP. Connected to 3-pin headers with latching plugs.

Outputs: Up to 3 outputs are able to be controlled from a single module. These have a common 24VDC power supply and ground. These outputs are mapped to bits 0, 1, and 2 of the first output byte

Inputs: Two position switch feedback signals are available. These inputs are mapped to bits 0 and 1 of the first input byte

CONN#1	Core	Function
6-WAY PLUG	Colour	
1	Black	0V
2	Blue	DATA Lo
3	Clear	Screen
4	White	DATA Hi
5	Red	+24V DC
6	N/C	-

CONN#2 & 3	24VDC
3-WAY PLUG	PNP
1	0V
2	+24V
3	Feedback

CONN#4	
4-WAY PLUG	
1	Solenoid 2 control
2	Solenoid common supply
3	Solenoid 1 control
4	Solenoid 3 control

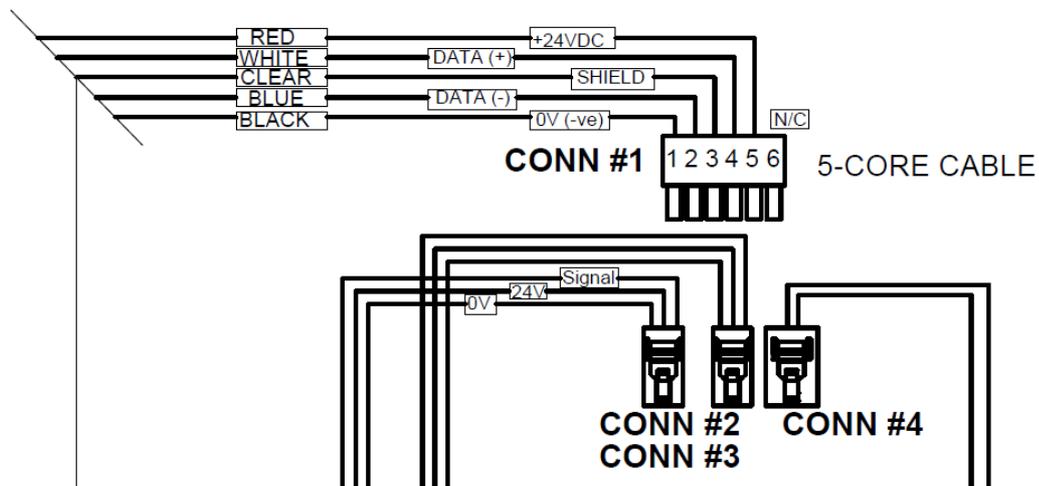


Fig 20: Internal electrical connection DeviceNET

NOTE!

The Producer/Consumer model

- The F783E control module can be considered as having both Inputs and Outputs in both directions, that is both upstream and downstream from the module. To reduce confusion this document refers to the producer/consumer model for information transfer. In this model the F783E Module CONSUMES data from the control system or network (i.e., controls the solenoid) and PRODUCES data for the control system (sends the state of the position switches back to the control system).
- In this respect the control of the solenoid is considered as an Output and the feedback from the switches is considered an Input. The connections between the control system and the module are agnostic, and ignored.

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

13.4. Safety instructions



DANGER!

Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)

Opening the control top in an explosive atmosphere is only allowed in a non-energised state
Use only cables and cable glands which have been approved for the respective application area and which have been installed according to the respective installation instructions. Do not expose the device to any mechanical or thermal loads exceeding that described in the operating instructions



WARNING!

Risk of injury due to electric shock!

- Before reaching into the system isolate the power supply when it is deemed the power supply could be capable of causing injury from electric shock!
- Observe applicable accident prevention and safety regulations for electrical equipment!

Risk of injury from improper installation!

- Installation should only be carried out by qualified personnel and only with the appropriate tools

Risk of injury, product loss or damage from unintentional activation of the system and uncontrolled operation of the output!

- Secure the system against unintentional activation
- Following installation ensure a controlled restart

13.5. Electrical installation and startup DeviceNET

13.5.1. Bulkhead connector

⇒ Generally the DeviceNET control top will be supplied with all internal cabling completed. There will be no need to change any portion of the internal connections in this case. In this case simply connect the bus system to the control head using the M12 screw-on connector on the bulkhead fitting.

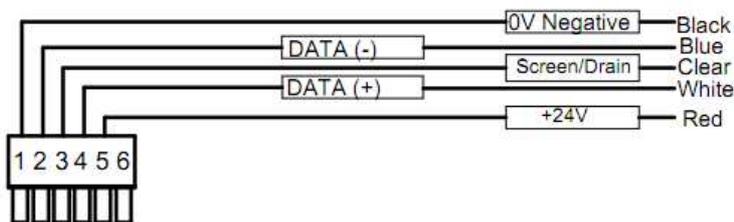
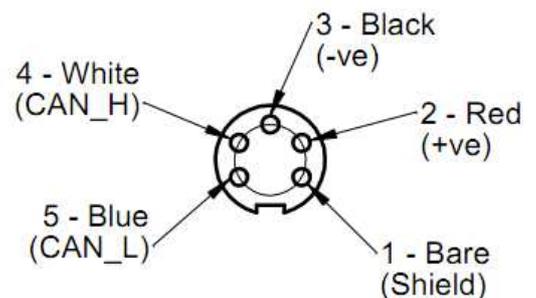


Fig 21: Electrical connection DeviceNET bulkhead plug



13.5.2. Cable gland and screw terminals

⇒ Connect the cable according to the wiring information in Section 13.3

For installation in Ex. situation: refer to special conditions in Section 5 of this manual. Use only Ex. certified product

13.5.3. Electronic module LED indicators

Input/ output indicators:

The DeviceNET module has three large LED indicator on the front. From left to right:

There are 3 indication modes for the module LEDs:

- Steady,
- Flash (approx. 0.5 sec on, 0.5 sec off),
- Twink (¼ sec on, ¼sec off, ¼sec on, ¾sec off)

LED Indicator	LED Indicator Condition	Description
Left LED	Steady RED	CLOSED indication switch made
"	Flashing RED	Output 1 de-energised, but Closed switch not made
"	Twink RED	Output 1 de-energised, and FTC* timer timed out, input not made
Center LED	Steady GREEN	OPEN indication switch made
"	Flashing GREEN	Output 1 energised, but Open input not made
"	Twink GREEN	Output 1 energised, and FTO* timer timed out, input not made
Right LED	Flashing AMBER	Device On-line but not being communicated with
"	Steady AMBER	Device On-line and communicating
"	Flashing RED	Device senses Bus voltage low
"	Steady RED	Device Bus-Off or Major Internal Fault
"	Flashing RED-AMBER-OFF	Node Beacon function

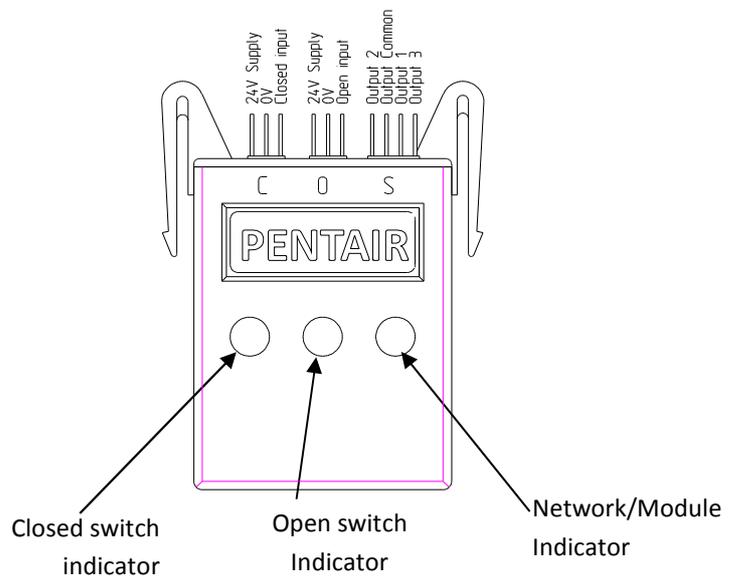


Fig 22: Electronic module LED indicators D-NET

13.6. Programming data

13.6.1. Device type

The F783E DeviceNET module is a Group 2 Slave device type “generic”.

13.6.2. Device status and alarms

The Input Status Byte describes the state of the module inputs, service flag setting, FTC and FTO timers set, module low voltage alarm, and device failure alarm. The bit pattern is read as follows:

Bit 0	Closed Limit Switch ON
Bit 1	Open Limit Switch ON
Bit 2	Service Flag Set
Bit 3	Double Indication Flag
Bit 4	Failed To Open (within set time)
Bit 5	Failed To Close (within set time)
Bit 6	Low Voltage
Bit 7	Module Failed

13.6.3. Device output map

The Input Status Byte describes the state of the module inputs, service flag setting, FTC and FTO timers set, module low voltage alarm, and device failure alarm. The bit pattern is read as follows:

Bit 0	Energise Output 1
Bit 1	Energise Output 2
Bit 2	Energise Output 3
Bit 3	Initiate ESD function
Bit 4	Reset Failed To Open flag
Bit 5	Reset Failed To Close flag
Bit 6	Reset Low Voltage flag
Bit 7	Reset Module Failed flag

Notes:

Only Output 1 is controlled by the ESD command, the other 2 outputs remain as set in the program.

The Service Flag is reset by writing a new service count value to parameter 13 either with a manager program, or via the PLC. The part of the control byte which resets the error flags is actually interpreted as a four bit binary number. This extends the range of functions of the control byte beyond the eight command limit. The command mapping of this byte segment, called a “nibble”, is below:

Bit Number	7	6	5	4	Decimal equivalent	Action
	0	0	0	0	0	No Action
	0	0	0	1	1	Reset Fail To Open error flag
	0	0	1	0	2	Reset Fail To Close error flag
	0	0	1	1	3	Reset FTO and FTC error flags
	0	1	0	0	4	Reset Low Voltage error flag
	0	1	0	1	5	Reset LV and FTO error flags
	0	1	1	0	6	Reset LV and FTC error flags
	0	1	1	1	7	Reset Double Indication error flag
	1	0	0	0	8	Reset Module Fail error flag
	1	0	0	1	9	Reset MF and FTO error flags
	1	0	1	0	10	Reset MF and FTC error flags
	1	0	1	1	11	No Action - reserved for future use
	1	1	0	0	12	Reset MF and LV error flags
	1	1	0	1	13	Set Node Beacon function
	1	1	1	0	14	No Action - reserved for future use
	1	1	1	1	15	No Action - ignored

13.6. Programming data Cont'd

13.6.4. Node beacon function

When bits 4, 6 and 7 of the control byte are set, the module will signal its location in the field by flashing the Status LED OFF-AMBER-RED at .5 sec intervals. This will enable service staff to locate a particular node in the field without relying on tag information.

13.6.5. Reset double indication service

When bits 4, 5 and 6 of the control byte are set, the Double Indication Fault Flag will be reset

13.6.6. Analogue and counter inputs

Input 1 of the Keystone module can be configured to read a 0-5 volt analogue input. When this function is set in parameters 22 and 23, the power supply from Output 1 changes from 24V to 5V, to suit a 5kOhm potentiometer. This is read internally as a 10 bit analogue signal, and can also be viewed with a manager program (parameter 40) as a value in the range of 0-1024.

Input 1 can also be set as a 5kHz counter input, and input 2 as a counter reset, for encoder applications.

13.6.7. Date format

The DeviceNet Specifications state that the format for expressing dates in a DeviceNet device shall be as follows:

“The range of values for variables of type DATE is from D#1972-01-01, the start of the Coordinated Universal Time (UTC) era, to D#2151-06-06 (a total range of 65536 days)

In other words, the date is recorded as the number of days since the 1st of January, 1972.

Some dates we might need to know:

14 th April 1912:	-21912 (The sinking of the Titanic)
1 st January 1972:	1
1 st January 1998:	9497
1 st January 1999:	9862
1 st January 2000:	10227
6 th June 2151:	65535 (Last Day)

14. HI-VIZ INDICATION OPTION

14.1. Installation instructions

Note this device will not operate correctly on AC.



DANGER!

Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)
Opening the control top in an explosive atmosphere is only allowed in a non-energised state

When upgrading an existing F783E installation do these things first:

Remove the control head cap and discard it. The upgrade kit will have the cap with lens and O-ring already fitted. Isolate the air supply to the control head before removing the two m6x30 caphead screws which secure the control head to the actuator or adaptor. Replace these with the two long stepped fixing screws (supplied in kit). To ensure the two O-rings under the control head are not dislodged in the process, replace one screw at a time. Tighten the two screws to 3.5Nm. Disconnect the proximity switch leads from the module. Continue as if from new as below.

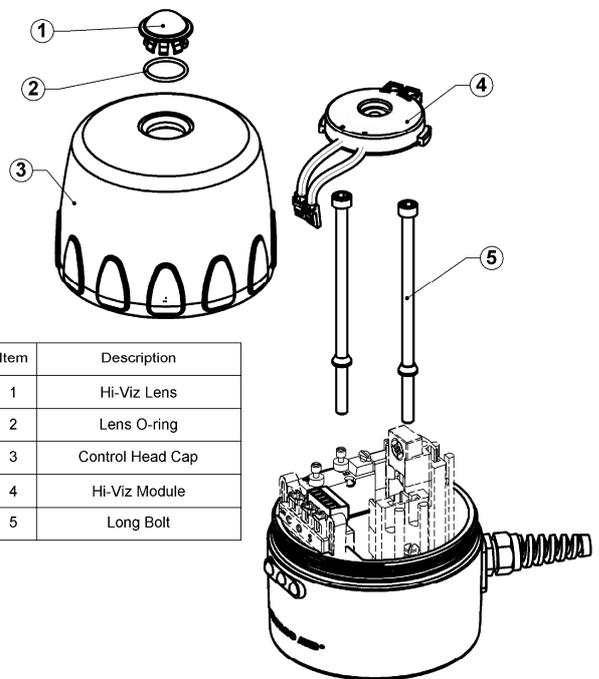
Assembling the F783E Hi-Viz unit c/w F783E Control head and Module:

Follow the instructions for assembling the F783E control head on the actuator up to the point of fitting the two M6x30 capscrews. Use instead the supplied long capscrews from the Hi-Viz kit box. Tighten the two screws to 3.5Nm. Remove the Hi-Viz unit from its packaging and push it down over the caps of the long fixing screws until it clicks into place. The Hi-Viz unit should be oriented such that the two cable connectors are on the same side as the module.

CAUTION - the LED's are **very bright**, do not look directly into the top of the Hi-Viz unit when it is powered.

Connect the proximity switches to the Hi-Viz unit where indicated, and connect the loose leads from the Hi-Viz unit to the module, the Closed switch should connect to the header marked RED on the Hi-Viz unit, and the loose lead on the same side of the unit (R) connects to the module Closed header. Similarly for the Open switch lead (G).

Restore the air supply to the control head and if it is safe to do so, test the operation of the indicators by cycling the actuator. Confirm the Red position LED is activated on both the module and the Hi-Viz unit together, and likewise the Green LEDs. Fit the new control head cap. The valve position indication will now be visible through the relief valve lens.



Item	Description
1	Hi-Viz Lens
2	Lens O-ring
3	Control Head Cap
4	Hi-Viz Module
5	Long Bolt

14.2. Fault finding and servicing the Hi-Viz

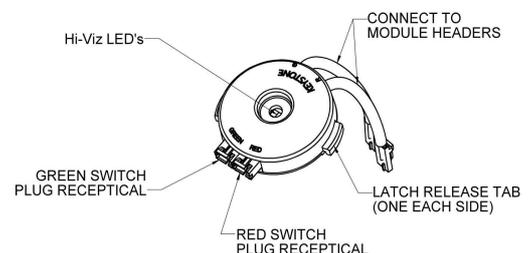
Fault Finding:

If there is no indication on the Hi-Viz LEDs, check the plug connections between the switches and the Hi-Viz unit, and between the Hi-Viz unit and the module.

If the wrong colour is indicated on the Hi-Viz (for example Red while Open and Green while Closed) swap the two cables from the proximity switches to the Hi-Viz headers.

Servicing:

The only serviceable components are the O-rings, to ensure the IP rating of the cap, all replacement O-rings must be sourced from an authorised PENTAIR supplier. Remove the cap and gently push the lens upwards slightly from the inside, hook out the old O-ring and replace with a new one. Allow the lens to return to its sealed position, pop it up and down a few times to be sure it is seated correctly.



15. DECOMMISSIONING

15.1. Safety instructions

**DANGER!****Danger - high pressure!**

Before loosening lines and valves, turn off the pressure and vent the lines.

Danger of explosion when used in explosive atmospheres (only in the event of a fault in zone 2)

Opening the control top in an explosive atmosphere is only allowed in a non-energised state

**WARNING!****Risk of injury due to electric shock!**

- Before reaching into the system isolate the power supply when it is deemed the power supply could be capable of causing injury from electric shock!
- Observe applicable accident prevention and safety regulations for electrical equipment!

Risk of injury from improper disassembly!

- Disassembly work should only be carried out by qualified personnel and only with the appropriate tools

15.2. Dismantling the F783E 2.0 control head

! Prior to starting work, check the system status. Confirm all system power is isolated and it is safe to disconnect cables

Procedure:

Cable gland version

- ⇒ Open the control head (follow the instructions in chapter 8 “Opening and closing the housing” if in doubt).
- ⇒ Disconnect the cable terminations from the module plug. Slacken the gland nut and pull the cable through the gland.
- ⇒ Loosen the pneumatic connections (for detailed instructions see chapter 9 “Pneumatic installation”).
- ⇒ Remove the two M6 caphead screws that retain the control head to the actuator.
- ⇒ Lift the control head clear of the actuator and any target.
- ⇒ If necessary, remove the target and any adaptor plates (if fitted).
- ⇒ Refit the cap to maintain the internal components in good condition.
- ⇒ Store or dispose of the control head in accordance with the guidelines in chapter 23

16. DISPOSAL

⇒ Dispose of the device or components in an environmentally responsible manner

NOTE!

Damage to the environment caused by device components contaminated with media

- Observe the relevant disposal and environmental protection regulations
- Observe national waste disposal regulations