10/2/8
15 May 2002

National Standards Commission

12 Lyonpark Road, North Ryde NSW

Notification of Change

Certificate of Approval No 10/2/8

Change No 1

The following changes are made to the approval documentation for the

Endress & Hauser Model M-Point DQ 600 Bulk Liquefied Gas Mass Flowmetering System

submitted by GEC Alsthom Australia
25 Princes Road
Regents Park NSW 2143.

1. In Certificate of Approval No 10/2/8 dated 3 March 1998, the following Condition of Approval should be added:

   "This approval expires in respect of new instruments on 1 July 2003."

2. In Certificate of Approval No 10/2/8 and its Technical Schedule both dated 3 March 1998, all references to the submittor should be amended to read:

   "Endress & Hauser Australia Pty Ltd
   Unit 12, RydeLink Business Park
   277 Lane Cove Road
   North Ryde NSW 2113"

Signed by a person authorised under Regulation 60 of the National Measurement Regulations 1999 to exercise the powers and functions of the Commission under this Regulation.

National Standards Commission

Certificate of Approval

No 10/2/8

Issued under Regulation 9
of the
National Measurement (Patterns of Measuring Instruments) Regulations

This is to certify that an approval for use for trade has been granted in respect of the

Endress & Hauser Model M-Point DQ 600 Bulk Liquefied Gas Mass Flow-metering System

submitted by GEC Alsthom Australia
25 Princes Road
Regents Park NSW 2143.

NOTE: This Certificate relates to the suitability of the pattern of the instrument for use for trade only in respect of its metrological characteristics. This Certificate does not constitute or imply any guarantee of compliance by the manufacturer or any other person with any requirements regarding safety.

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CONDITIONS OF APPROVAL

This approval becomes subject to review on 1 July 2001, and then every 5 years thereafter.

Instruments purporting to comply with this approval shall be marked NSC No 10/2/8 and only by persons authorised by the submittor.

It is the submittor's responsibility to ensure that all instruments marked with this approval number are constructed as described in the documentation lodged with the Commission and with the relevant Certificate of Approval and Technical Schedule. Failure to comply with this Condition may attract penalties under Section 19B of the National Measurement Act and may result in cancellation or withdrawal of the approval, in accordance with the Commission's Document 106.

The Commission reserves the right to examine any instrument or component of an instrument purporting to comply with this approval.

Auxiliary devices used with this instrument shall comply with the requirements of General Supplementary Certificate No S1/0/A.

Special: (for Provisional Variants 4 and 5)

These approvals becomes subject to review on 1 October 1997, and then every year thereafter.

Instruments purporting to comply with this approval shall be marked NSC No P10/2/8 and only by persons authorised by the submittor.

The submittor is to inform the Commission of each instrument prior to it being submitted to a Trade Measurement Authority for verification.

Instruments are to be tested at six-monthly intervals after the initial verification test. Such tests are to be arranged by the submittor and supervised by a Trade Measurement Authority; the submittor is to provide the Commission with copies of the results of all tests.

In the event of unsatisfactory performance or of suitable results not being received by the Commission, this approval may be withdrawn.

DESCRIPTIVE ADVICE

Pattern: approved 10 June 1996

- A bulk mass flowmetering system using an Endress & Hauser model M-Point DQ 600 flow sensor of 25 mm nominal diameter for the delivery of liquefied gases.

Variants: approved 10 June 1996

1. With an Endress & Hauser model M-Point DQ 600 flow sensor of 8 mm nominal diameter.
2. With the flow sensor and/or the flow transmitter as intrinsically safe components.
3. With an Endress & Hauser model Promass 63M compact mass flowmeter.

Variants: provisionally approved 10 June 1996

4. With an Endress & Hauser model M-Point DQ 600 flow sensor of 50 mm nominal diameter.
5. With an Endress & Hauser model M-Point DQ 600 flow sensor of 80 mm nominal diameter.

Variant: approved 24 February 1998

6. With an Endress & Hauser model M-Point DQ 600 flow sensor of 15 mm nominal diameter.

Technical Schedule No 10/2/8 describes the pattern and variants 1 to 6.

FILING ADVICE

The documentation for this approval comprises:

Certificate of Approval No 10/2/8 dated 3 March 1998
Technical Schedule No 10/2/8 dated 3 March 1998 (incl. Test Procedure)
Figures 1 to 7 dated 3 March 1998

Signed and sealed by a person authorised under Regulation 9 of the National Measurement (Patterns of Measuring Instruments) Regulations to exercise the powers and functions of the Commission under this Regulation.

TECHNICAL SCHEDULE No 10/2/8

Pattern: Endress & Hauser Model M-Point DQ 600 Bulk Liquefied Gas Mass Flowmetering System.

Submittor: GEC Alsthom Australia
25 Princes Road
Regents Park NSW 2143.

1. Description of Pattern

A bulk liquefied gas mass flowmetering system incorporating an Endress and Hauser model M-Point DQ 600 flow sensor of 25 mm nominal diameter and an Endress & Hauser microprocessor-based flow transmitter. The flow sensor and the flow transmitter form the mass flowmeter.

The system is approved for the delivery of LPG and other liquefied gases having a density between 500 and 1000 kg/$m^{3.}$.

The maximum flow rate is 300 kg/min and the minimum flow rate is 30 kg/min. The minimum quantity is 30 kg.

1.1 Flowmetering System component Structure

A typical system is shown in Figure 1.

(i) Supply Tank

The supply tank is of adequate capacity to ensure that at maximum flow rate the pressure in the tank does not drop to the point where vapour occurs. A low-level detection device may be fitted.

(ii) Pump

The pump shall be positioned below the supply tank so that it is always in a state of flooded suction (**suction head**). Alternatively, the pump may be positioned above the supply tank, in which case the pump shall be specifically designed for use with LPG in **suction lift** installations.

There shall be no restrictive fittings within ten pipe diameters of the pump inlet. The inlet pipe to the pump is larger than the outlet from the pump. The external pump by-pass relief valve is installed in a line returning to the supply tank.

(iii) Vapour Detection/Elimination

The flowmeter is protected from the measurement of vapour by correct installation and by the following components:

(a) Vapour Purger (Figure 2)

A Schlumberger (Neptune) 38 mm float-operated vapour purger with integral strainer, or other suitable means of vapour elimination, located upstream of the flow sensor. A thermometer well is situated in the strainer cover.

The vapour purger is vented through a non-return valve, via a vapour line not less than 20 mm in diameter to the vapour space in the supply tank.

(b) Vapour Detection System

The system comprises a density detection system located in the flow sensor, and a solenoid-operated valve located immediately downstream of the flow sensor.

When a drop in density is detected due to the presence of vapour, the valve will automatically close preventing flow through the sensor. Once vapour is no longer detected the valve will re-open.

(iv) Flowmeter

An Endress and Hauser model M-point DQ 600 C flow sensor (Figure 3) determines mass flow and density by measuring the effects of Coriolis forces on a pair of straight, parallel flow measuring tubes, which are oscillated at their resonant frequency by an electromagnetic excitation coil. The pipe oscillations are scanned at both the inflow and outflow sides of the pipes by two optical sensors.

An Endress and Hauser model Procom II ZL 6072 C remote microprocessor-based flow transmitter (Figure 4) generates an oscillatory voltage to the electromagnetic excitation coil which causes the flow measuring tubes to vibrate. It also processes and converts signals from the optical sensors into an output signal directly proportional to mass flow rate.

The flow sensor and flow transmitter form the mass flowmeter.

(v) Indicator

A Contrec model 405LR.10E 'Flow Computer' digital indicator Figure 4, or other compatible Commission-approved electronic indicator is used. The indicator displays in units of mass and may be in a 'flameproof' enclosure.

The indicator operates with either AC mains supply or DC supply (12 to 28 V). If power is disconnected, the totaliser value and the last mass delivered are retained in a non-volatile memory. The AC supply version also has a battery back-up for indication recall.

When the power is applied, a display check is initiated causing all segments to illuminate for about 5 seconds, after which the last mass delivered is displayed.

Mass (resettable)	9999.99 in 0.01 kg increments
Totaliser	999999 in 1 kg increments

(vi) Outlet Piping/Transfer Device

The outlet pipe downstream from the solenoid-operated valve has provision for a pressure gauge, and is fitted with a non-return valve and a control valve. A flow rate control valve may also be fitted.

If fitted with a delivery house it shall comply with the SA code for hoses in use with liquefied petroleum gases. A shut-off device is fitted at the end of the hose.

The control valve/shut-off device shall be the transfer device for the measurement and there shall no intermediate outlets between the meter and the transfer device.

1.2 Sealing and Verification/Certification Provision

Provision is made for sealing the flow transmitter into its housing and for sealing the cover for the electronics of the flow sensor which contains the calibration functions of the instrument.

Provision is also made for a verification/certification mark to be applied.

1.3 Markings

Instruments are marked with the following data, together in the one location:

Manufacturer's name or mark	
Meter model	
Serial number	
NSC approval number	10/2/8
Maximum flow rate	..... kg/min
Minimum flow rate	..... kg/min
Approved for density range	500 to 1000 kg/m^3
Minimum quantity	..... kg
Density range	... to ... kg/m^3
Minimum operating pressure	..... kPa
Product for which the instrument is verified	.....

2. Description of Variants

2.1 Variant 1

With an Endress and Hauser model M-point DQ 600 C flow sensor of 8 mm nominal diameter. The maximum and minimum flow rates are 30 kg/min and 6 kg/min respectively. The minimum quantity is 6 kg.

2.2 Variant 2

With the flow sensor and/or the flow transmitter as intrinsically safe components in which case the 'C' suffix of the model becomes a 'Z'. Note that components may carry two nameplates, each bearing the different model numbers.

2.3 Variant 3

With an Endress and Hauser model Promass 63M compact mass flowmeter (Figures 6 and 7) which has the flow transmitter integral with the flow sensor. The flow sensor may be of any of the nominal diameters described in this approval.

2.4 Variant 4

With and Endress and Hauser model M-point DQ 600 C flow sensor of 50 mm nominal diameter. The maximum and minimum flow rates are 1200 kg/min and 60 kg/min respectively. The minimum quantity is 60 kg.

A Schlumberger (Neptune) 50 mm float-operated vapour purger with integral strainer, or other suitable means of vapour elimination, is used.

2.5 Variant 5

With an Endress and Hauser model M-point DQ 600 C flow sensor of 80 mm nominal diameter. The maximum and minimum flow rates are 3000 kg/min and 150 kg/min respectively. The minimum quantity is 300 kg.

A Schlumberger (Neptune) 50 mm float-operated vapour purger with integral strainer, or other suitable means of vapour elimination, is used.

2.6 Variant 6

With an Endress and Hauser model M-point DQ 600 C flow sensor of 15 mm nominal diameter. The maximum and minimum flow rates are 100 kg/min and 6 kg/min respectively. The minimum quantity is 10 kg.

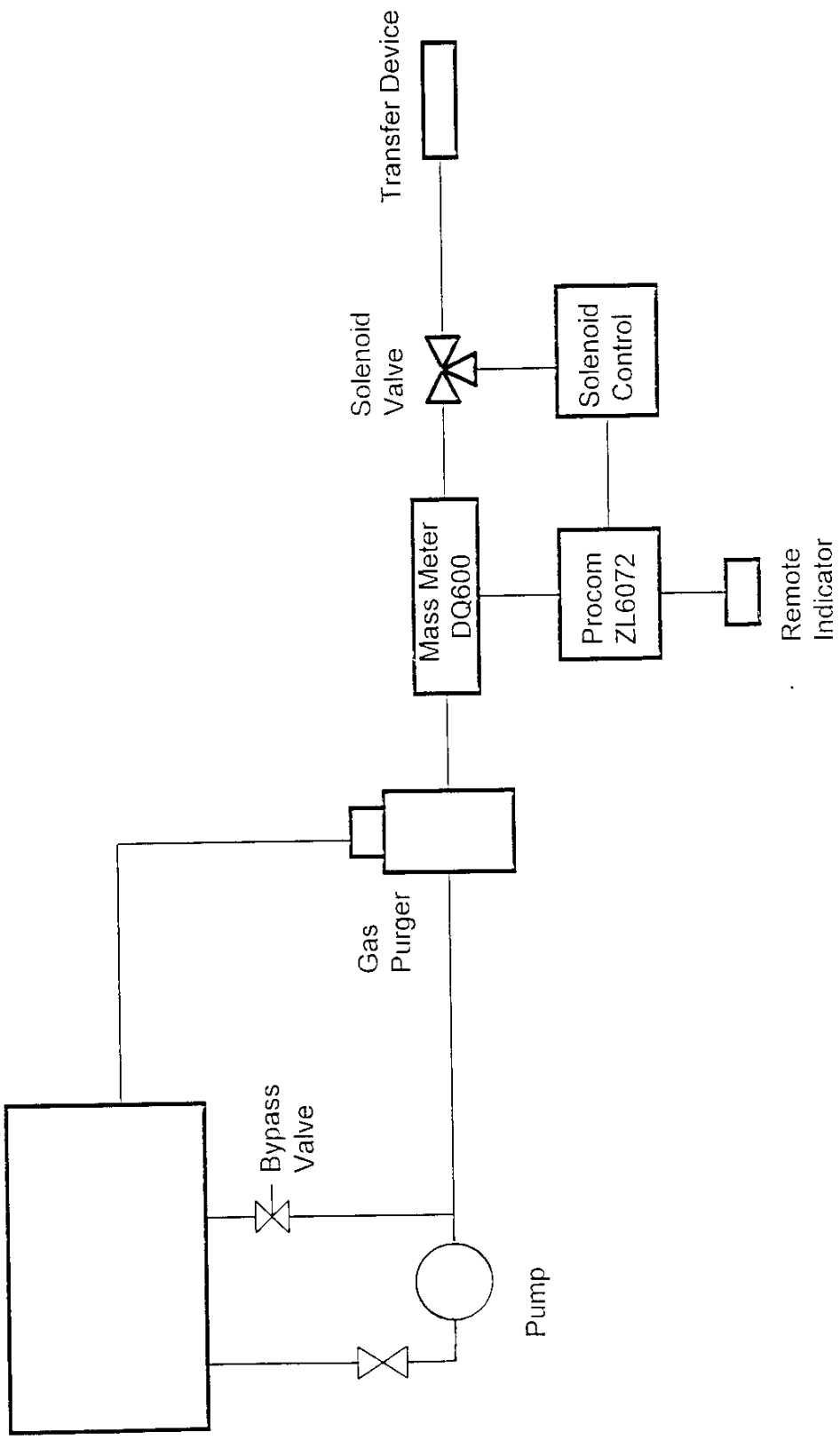
TEST PROCEDURE

Instruments should be tested in accordance with the Inspector's Handbook using the liquid with which they will be used and which is marked on the data plate.

Maximum Permissible Errors at Verification/Certification

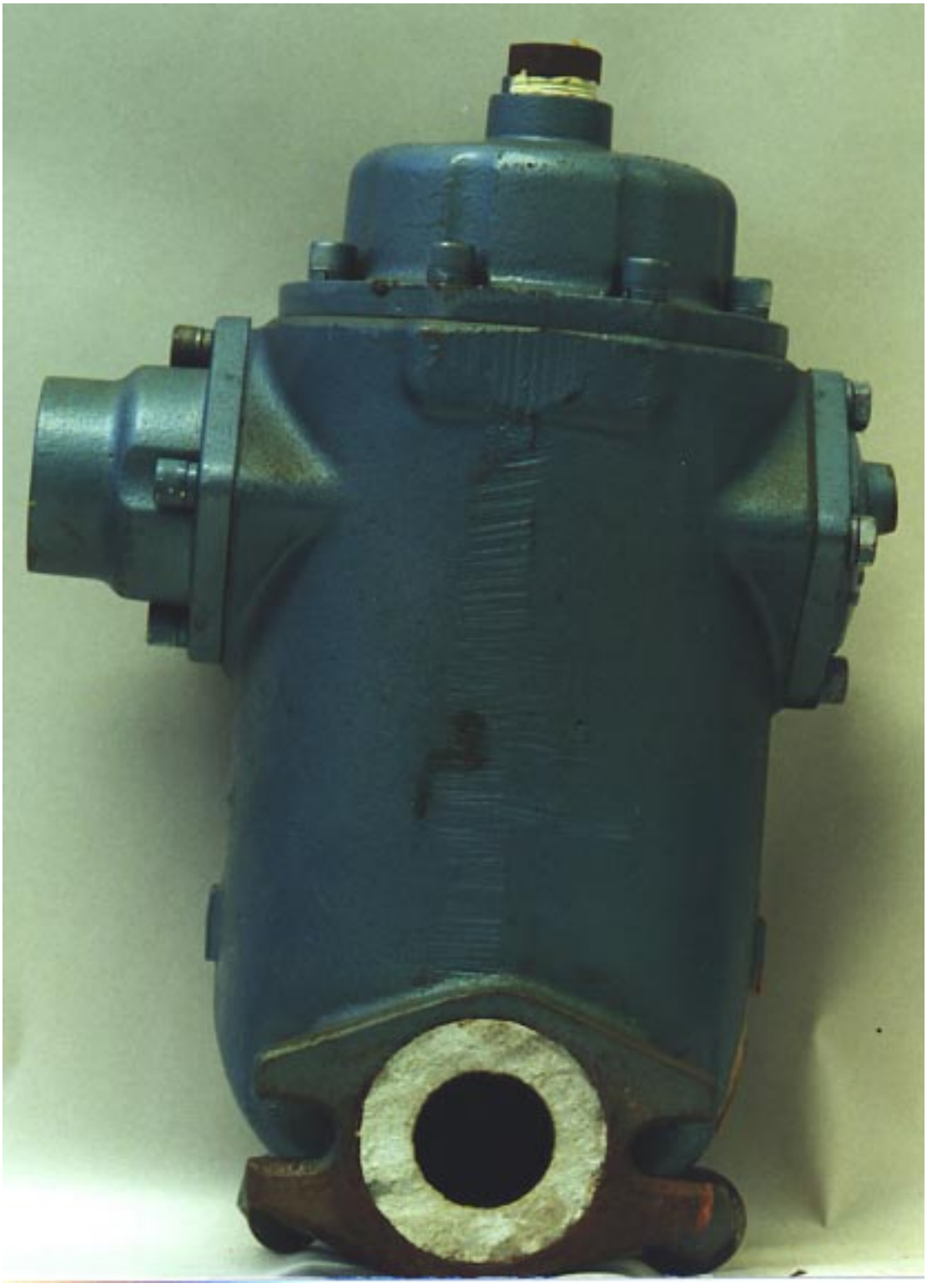
The maximum permissible error applied during a verification test from normal flow rate to the minimum flow rate specified in the Certificate of Approval or Technical Schedule is ±0.6%.

FIGURE 10/2/8 - 1



Typical Liquefied Gas Mass Flowmetering System Using M-point Flow Sensor

FIGURE 10/2/8 - 2



Schlumberger (Neptune) Vapour Purger

FIGURE 10/2/8 - 3

Typical M-point Flow Sensor

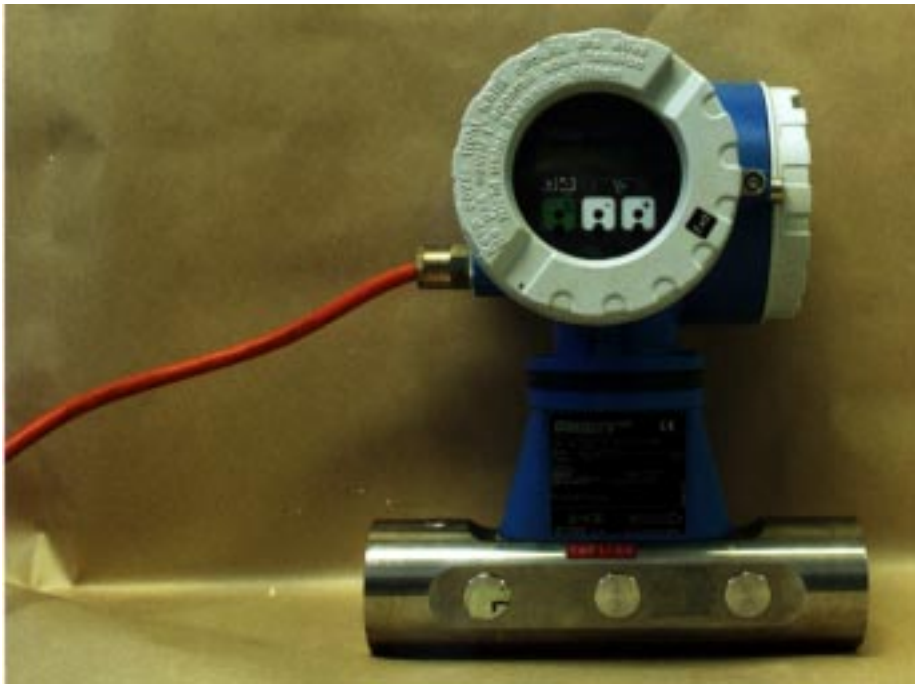
FIGURE 10/2/8 - 4

Flow Transmitter

FIGURE 10/2/8 - 5

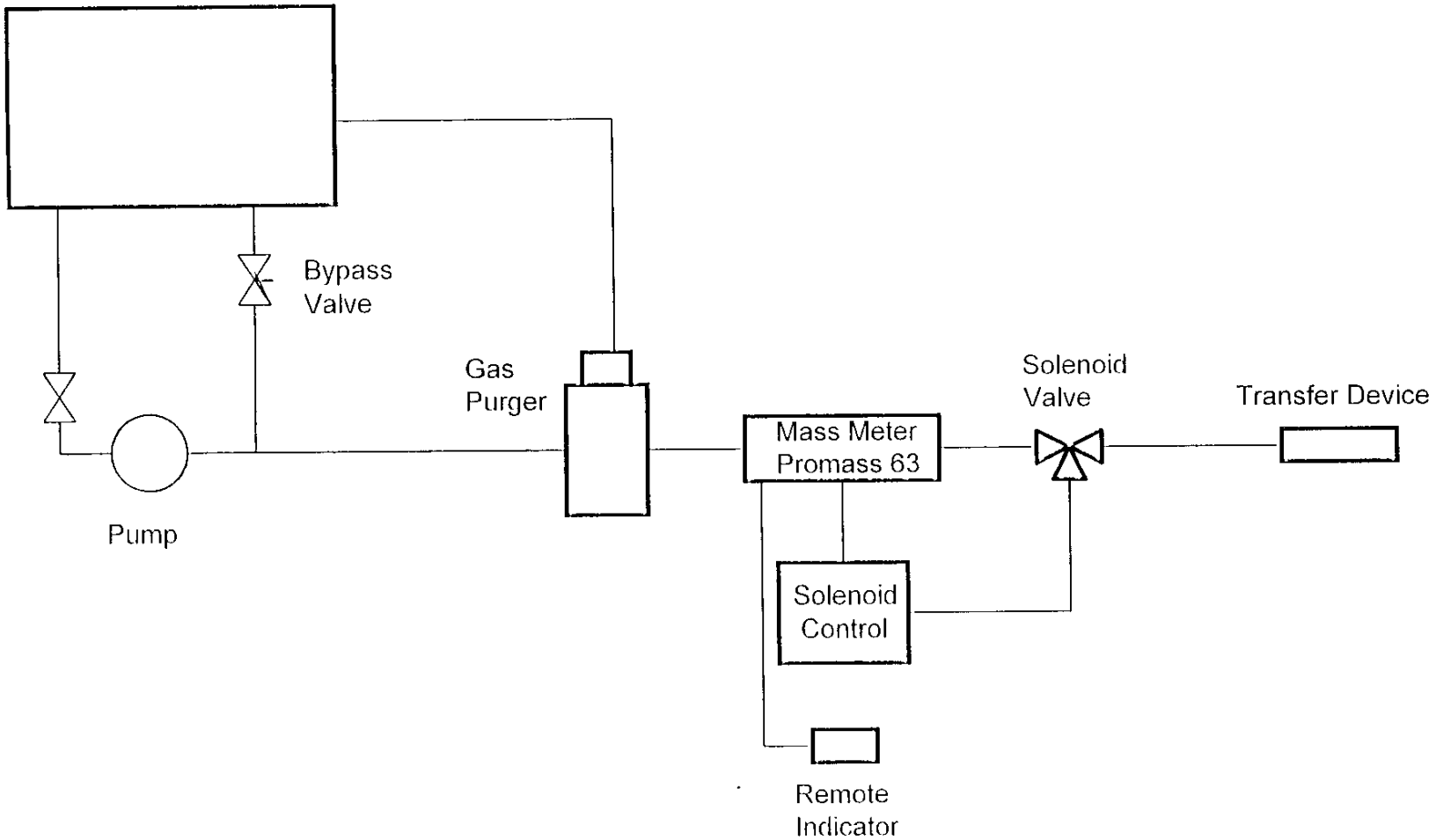
Contrec Model 405LR.10E Indicator

FIGURE 10/2/8 - 6



Typical Promass Flow Sensor

FIGURE 10/2/8 - 7



Typical Liquefied Gas Mass Flowmetering System Using Promass Flow Sensor