Ratio Monitor / Totalizer
with high / low alarms and analog output

Ex i ✓

Modbus **Ex** **IEC** **IECEx**

Application examples: Salty Off-Shore conditions

Extreme cold weather at polar regions

Red flashing LED backlight in case of a ratio alarm.

The F-Series is your first and safest choice for field mount indicators in safe and hazardous area applications. Especially in harsh weather conditions like rain, snow, salty atmospheres and temperatures between -40°C up to +80°C (-40°F up to 176°F).

Advantages

- Robust aluminum or stainless steel 316L field enclosure (IP67 / NEMA Type4X). It is so rugged, a truck can even stand on it!
- Intrinsically Safe available - ATEX and IECEx approval for gas and dust applications.
- Programming can be done by your own crew, with the sensible menu-driven structure, saving cost and irritation. Know one, know them all!
- Very diverse mounting possibilities: walls, pipes, panels or directly onto outdoor sensors!

Features

- Calculates ratio between flow A & B.
- Displays ratio, flow rate A and B and total A & B (resettable).
- 4 alarm values: low-low, low, high and high-high ratio alarm.
- Large 17mm (0.67") digits.
- LED backlight option.
- Ability to process all types of signals: Sine wave (coil), NAMUR, NPN/PNP pulse, Reed-switch, Active pulse signals.
- Up to three free configurable alarm outputs.
- Analog (loop powered) according to the calculated ratio, flow rate A or flow rate B.
- Full Modbus communication RS232/485/TTL.
- Power requirements: Loop or battery powered, 8 - 30V DC 8 - 24V AC/DC or 115 - 230V AC.
- Sensor supply: 3 / 8.2 / 12 / 24V DC.
- Auto backup of settings and running totals.

Introduction

The flowcomputer Model F114 has been developed to calculate and monitor the actual ratio between two separate flows. Typical applications are found where locally a two component product is mixed, for example in construction works, roof or wall isolation, glueing and coating. The F114 offers the facility to set two low ratio and two high ratio alarm values. Special precautions are taken to allow start-up problems and incorrect ratio readings for a certain period of time. Based on the location of the flowmeters, a selection can be made out of six different formulas. A wide selection of options further enhances the capabilities of this model.

Display

The display has large 17mm (0.67") and 8mm (0.31") digits which show the ratio, alarm values, flow rate A, total A and flow rate B, total B. On-screen engineering units are easily configured from a comprehensive menu. The ratio can be displayed as 1:___ or as a percentage.

Configuration

All configuration settings are accessed via a simple operator menu which can be password protected. Each setting is clearly indicated with an alphanumerical description, which avoides confusing abbreviations and baffling codes. Once familiar with one F-series product, you will be able to program all models in the series without a manual. All settings are safely stored in EEPROM memory in the event of sudden power failure.

Communication

All process data and settings can be read and modified manually or through the Modbus communication link (RS232 / RS485). Full Modbus functionality remains available for the Intrinsically Safe version (TTL).

Bright LED backlight.

Trend indication

Clear 17mm (0.67") numeric digits

3 rugged buttons and user-friendly menu-structure: "**Know one, know them all!"**

Intrinsically Safe available:**ATEX and IECEx.**

Status indication

Clear 8mm (0.31") alphanumeric digits

Robust IP67 (Type4X) field enclosure.
So rugged, a truck can even stand on it!

Resistant to harsh weather conditions like snow,rain and -40°C to +70°C (-40°F to +158°F)

Alarm output

Up to three free configurable outputs are available to transmit the ratio alarm condition. The output signals can be a passive NPN, active PNP or an isolated electro-mechanical relay. Two outputs are available in Intrinsically Safe applications.

Hazardous areas

This model is ATEX and IECEx certified as Intrinsically Safe for gas applications with an allowed ambient temperature of -40°C to +70°C (-40°F to +158°F) and dust applications with an allowed ambient temperature of -40°C to +50°C (-40°F to +122°F). A flame proof Ex d enclosure with ATEX/IECEx certification is also available.

Analog output signal

The calculated ratio, flow rate A or B can be re-transmitted with the (0)4 - 20mA or 0 - 10V DC output signal. The output signal is updated eight times per second. The output value is user defined in relation to the ratio or flow rate, e.g. 4mA equals to 1 : 50 and 20mA equals to 1 : 1. The output signal can be passive, active or isolated where the passive output type will loop power the F114.

All info at a glance

Easy to install

Easy to program

Know one know them all!

Reliable

User-friendly

Overview application F114

The F-Series is your first and safest choice for field mount indicators in safe and hazardous area applications. Especially in harsh weather conditions like rain, snow, salty atmospheres and temperatures between -40°C up to +80°C (-40°F up to 176°F). Two component applications like glueing, blending or mixing where continuous ratio monitoring and/or totalizing is important.
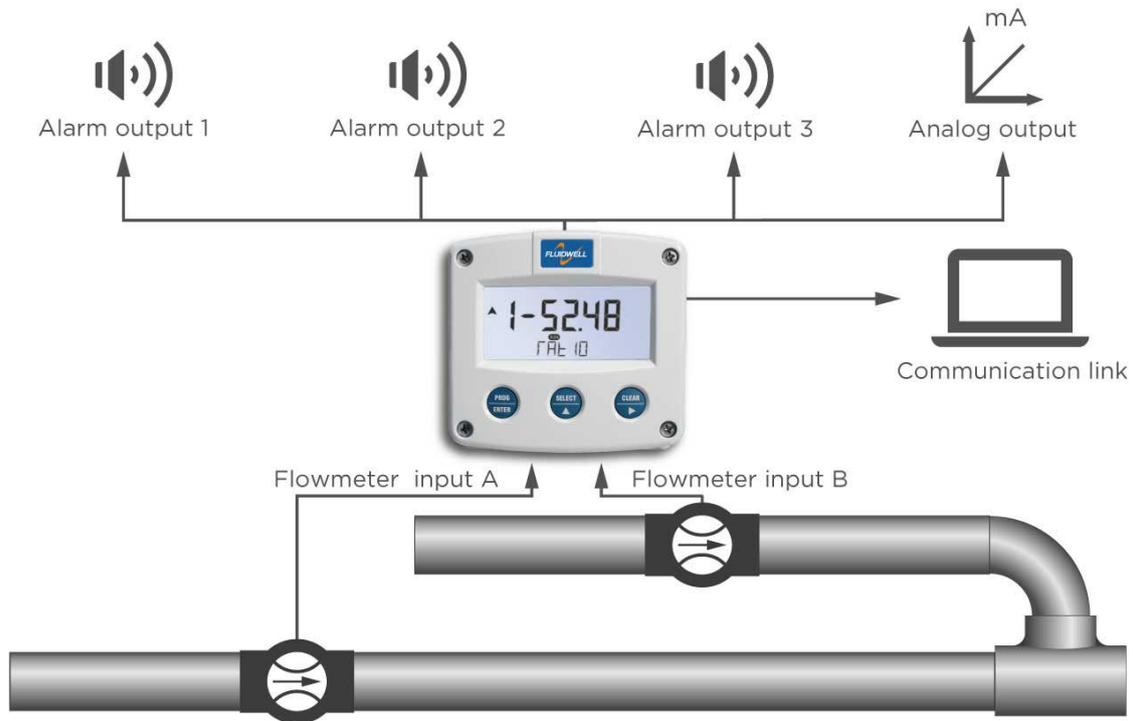
Signal input

The F114 accepts most pulse input signals for volumetric flow or mass flow measurement. The input signal types can be selected by the user in the configuration menu without having to adjust any sensitive mechanical dip-switches or jumpers.

Type of signal	Resistance	Low Pass filter (LP)	Max. frequency	Max. frequency Low Pass filter (LP)	Min. amplitude P-P	Remark
NPN	100kΩ pull-up	100kΩ pull-up	6kHz Threshold 1.2V	1.2kHz		Open collector
REED	1MΩ pull-up	1MΩ pull-up	1.2kHz Threshold 1.2V	120Hz		
PNP	100KΩ pull-down	100KΩ pull-down	6kHz Threshold 1.2V	1.2kHz		
NAMUR	820Ω pull-down	-	4kHz	-		External power required
COIL LO	-	-		-	$80mV_{pp}$	Default sensitivity
COIL-HI	-	-	-	-	$20mV_{pp}$	Sensitive for interference!
COIL-HI (Type ZF)					$10mV_{pp}$	
ACTIVE 8.2V DC	3K9Ω		10kHz Threshold 4V			External power required
ACTIVE 12V DC	4KΩ		10kHz Threshold 6V			External power required
ACTIVE 24V DC	3KΩ		10kHz Threshold 12V			External power required

Enclosures

Various types of enclosures can be selected, all ATEX and IECEx approved. The F114 is supplied in an GRP panel mount enclosure as standard, which can be converted to an IP67 / NEMA Type4X GRP field mount enclosure by the addition of a back case. Most popular is our robust aluminum field mount enclosure which is also available with an extended backcover with undrilled preparation for direct meter mounting at the back side. It is so rugged, even a truck can stand on it! For the most challenging environments we have a durable high grade Stainless steel 316L enclosure. All enclosures have a IP67 / NEMA Type4X rating and EU or U.S. cable gland entry threads available.

Dimensions enclosures

Aluminum & GRP panel mount enclosure

HB & HC enclosures   **panel cut-out**

Aluminum, GRP & Stainless steel 316L field mount enclosures

Extended back cover

Mounting bolt recess not available for flat bottom enclosures.

Cable entries

Aluminum / Stainless Steel

HA
HL
HM HSM
HN
HO HSO
HP
HT
HU HSU
HV
HZ

GRP

HD
HE
HF
HG
HH
HJ
HK

Flat bottom, no holes available.

Extended Aluminum

HBM
HBO
HBU

Terminal connections

Configuration example F114-P-AP-CH-OT-(PX)-XX-ZX
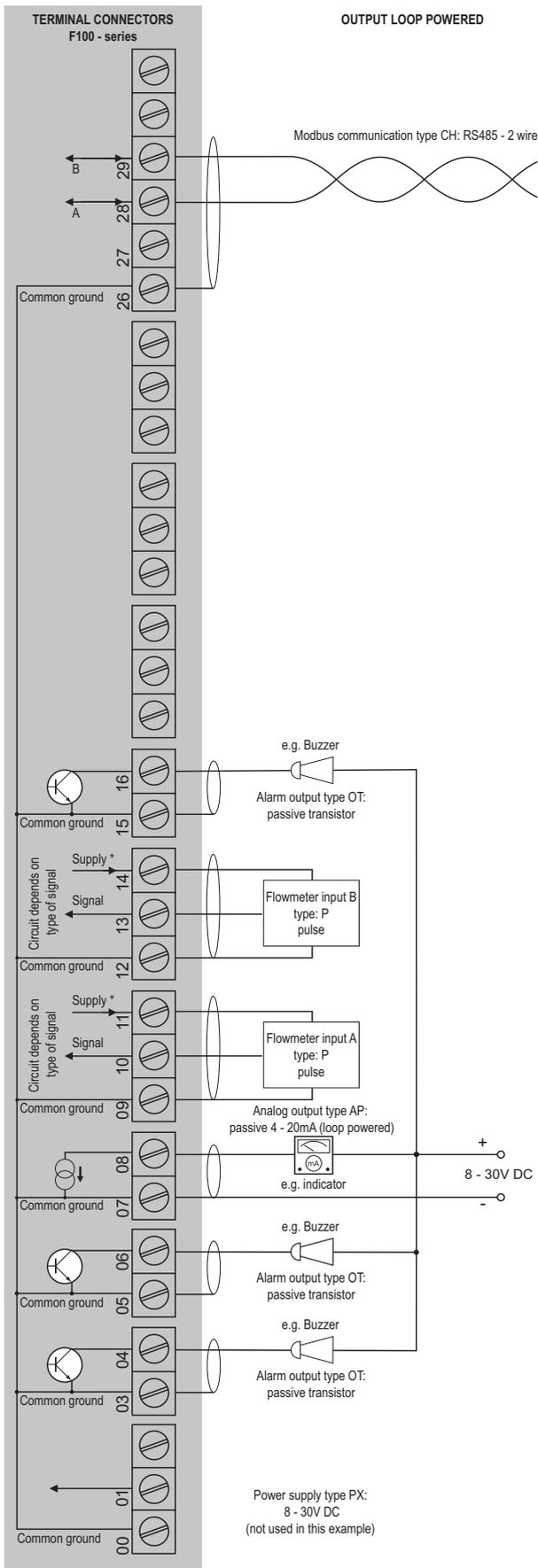
Configuration example F114-P-AI-CI-OR-PM-XX-ZX

TERMINAL CONNECTORS F100 - series

OUTPUT LOOP POWERED

B 29
A 28
27
Common ground 26

Modbus communication type CH: RS485 - 2 wire

e.g. Buzzer
16
Alarm output type OT:
passive transistor
Common ground 15

Circuit depends on type of signal
Supply * 14
Signal 13
Common ground 12
Flowmeter input B
type: P
pulse

Circuit depends on type of signal
Supply * 11
Signal 10
Common ground 09
Flowmeter input A
type: P
pulse

Analog output type AP:
passive 4 - 20mA (loop powered)
08
+
e.g. indicator
Common ground 07
8 - 30V DC
-

e.g. Buzzer
06
Alarm output type OT:
passive transistor
Common ground 05

e.g. Buzzer
04
Alarm output type OT:
passive transistor
Common ground 03

01
Power supply type PX:
8 - 30V DC
(not used in this example)
Common ground 00

*   For pulse type inputs: V_{ref}: 1.2V/3.0V available.- NO power output, available I_{supply}: <1mA.
    Note: using these ref. voltages at max. load, will reduce battery life significantly.

TERMINAL CONNECTORS F100 - series

115 - 230V AC POWER SUPPLY

Z 31
Y 30
B 29
A 28
Common ground 26

Modbus communication type CI: RS485 - 4 wire

Alarm output type OT:
passive transistor
16
+
e.g. Buzzer
8 - 24V DC
Common ground 15
-

Supply * 14
Signal 13
Common ground 12
Flowmeter input B
type: P
pulse

Supply * 11
Signal 10
Common ground 09
Flowmeter input A
type: P
pulse

e.g. indicator
08
+
Analog output type AI:
passive isolated 4 - 20mA
8 - 30V DC
07
-

e.g. Buzzer
06
Alarm output type OR:
mechanic relay
05

e.g. Buzzer
04
03

02
N
Main supply
Power supply type PM:
115 - 230V AC
01
L1
Common ground 00

*Supply voltage: 3.2 / 8.2 / 12 / 24V DC to sensor

Hazardous area applications

The F114-XI has been certified according to ATEX and IECEx by DEKRA for use in Intrinsically Safe applications with an ambient temperature of -40°C to +70°C (-40°F to +158°F).
For equipment category Dust, zone 20 (1 D / EPL Da), the maximum ambient temperature is limited to 50°C (+122°F) and a maximum dust layer thickness of 200mm.

• The ATEX markings for gas and dust applications are:
  ⟨Ex⟩ Gas: **II 1 G Ex ia IIB/IIC T4 Ga.**
  ⟨Ex⟩ Dust: **II 1 D Ex ia IIIC T$_{200}$ 100 °C Da.**
• The IECEx markings for gas and dust applications are:
  Gas: **Ex ia IIC/IIB T4 Ga.**
  Dust: **Ex ia IIIC T$_{200}$ 100 °C Da.**

Besides the two I.S. power supplies for the alarm outputs, it is allowed to connect up to four I.S. power supplies in IIB/IIIC applications or one in IIC applications. Consult the certificate for the maximum input and output values of the circuits. Full functionality of the F114 remains available, including 4 - 20mA output, alarm outputs and Modbus communication (type CT). Power supply type PD-XI offers a 8.2V sensor supply e.g. for two Namur sensors. An ATEX/IECEx approved flame proof Ex d enclosure is available as well. Please contact your supplier for further details.
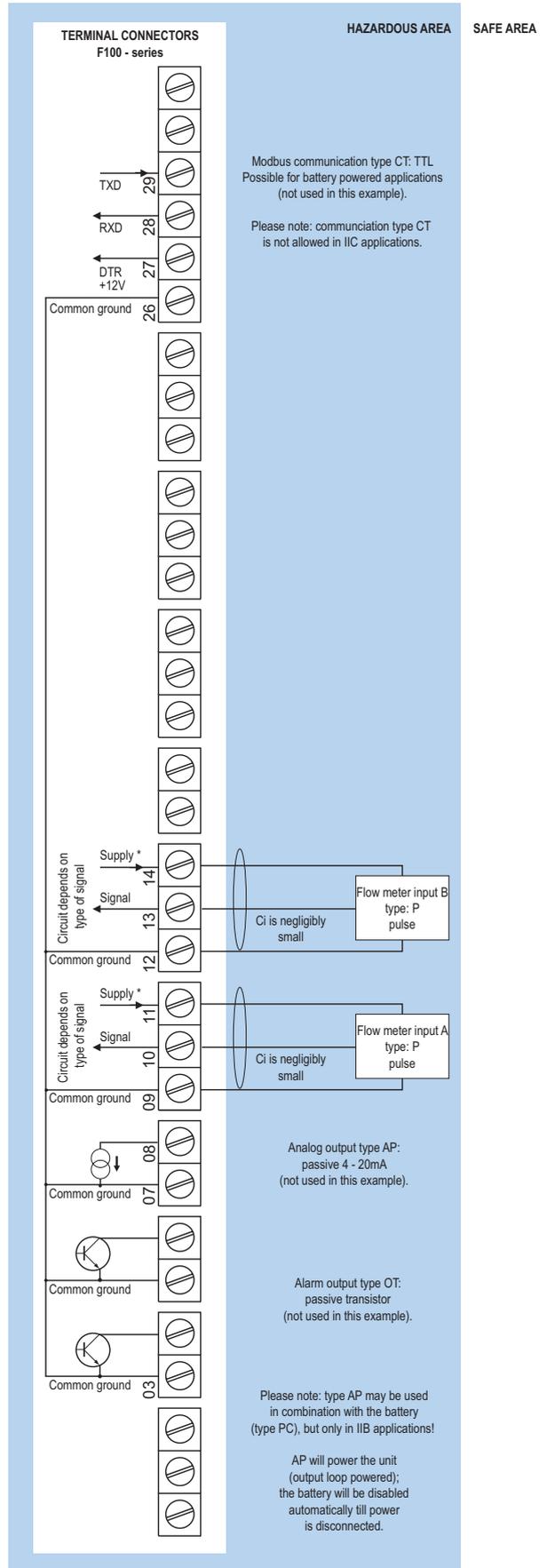
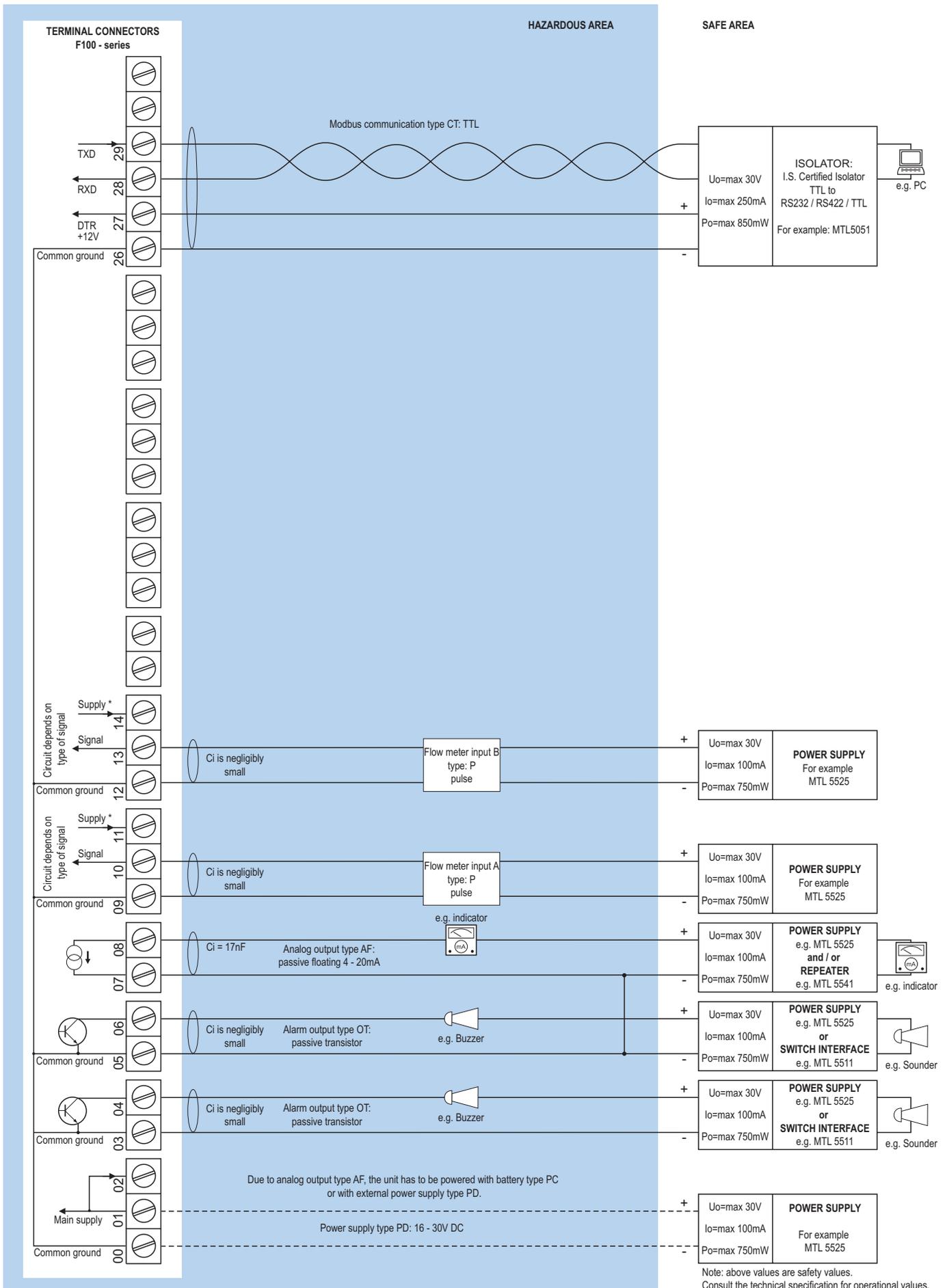*Certificate of conformity KEMA 03ATEX1074 X*
• IECEx DEK 11.0042X

Configuration example IIB / IIIC and IIC
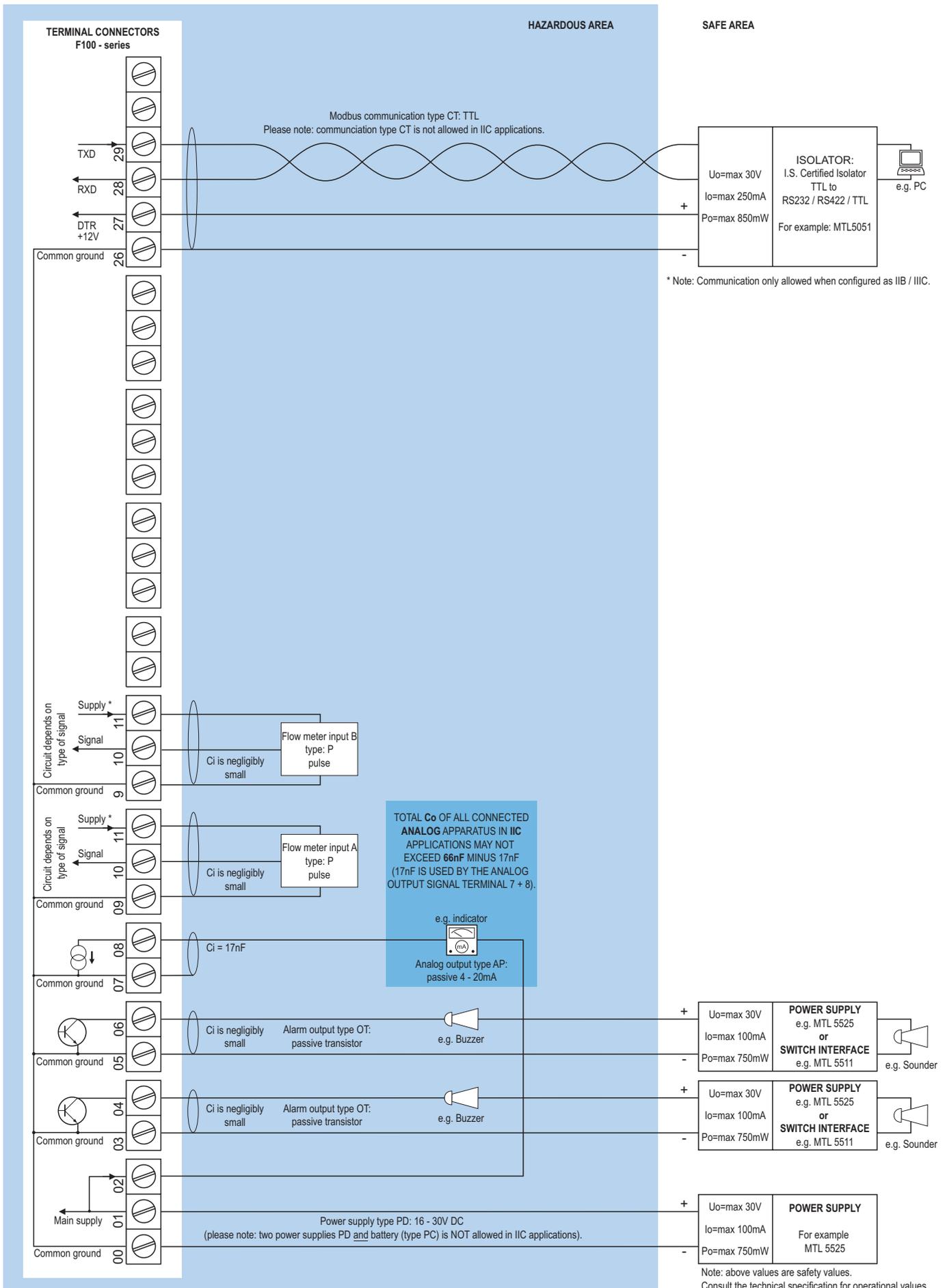*F114-P-(AP)-(CT)-(OT)-PC-XI - Battery powered unit*

TERMINAL CONNECTORS F100 - series

HAZARDOUS AREA   SAFE AREA

TXD 29
RXD 28
DTR +12V 27
Common ground 26

Modbus communication type CT: TTL
Possible for battery powered applications
(not used in this example).

Please note: communciation type CT
is not allowed in IIC applications.

Circuit depends on type of signal
Supply * 14
Signal 13
Common ground 12

Ci is negligibly small

Flow meter input B
type: P
pulse

Circuit depends on type of signal
Supply * 11
Signal 10
Common ground 09

Ci is negligibly small

Flow meter input A
type: P
pulse

08
Common ground 07

Analog output type AP:
passive 4 - 20mA
(not used in this example).

Common ground

Alarm output type OT:
passive transistor
(not used in this example).

Common ground 03

Please note: type AP may be used
in combination with the battery
(type PC), but only in IIB applications!

AP will power the unit
(output loop powered);
the battery will be disabled
automatically till power
is disconnected.

*   For pulse type inputs: V$_{ref}$: 1.2V/3.0V available.- NO power output, available I$_{supply}$: <1mA.
     Note: using these ref. voltages at max. load, will reduce battery life significantly.

Configuration example IIB / IIIC and IIC - F114-P-AP-(CT)-OT-(PX)-XI - Output loop powerd
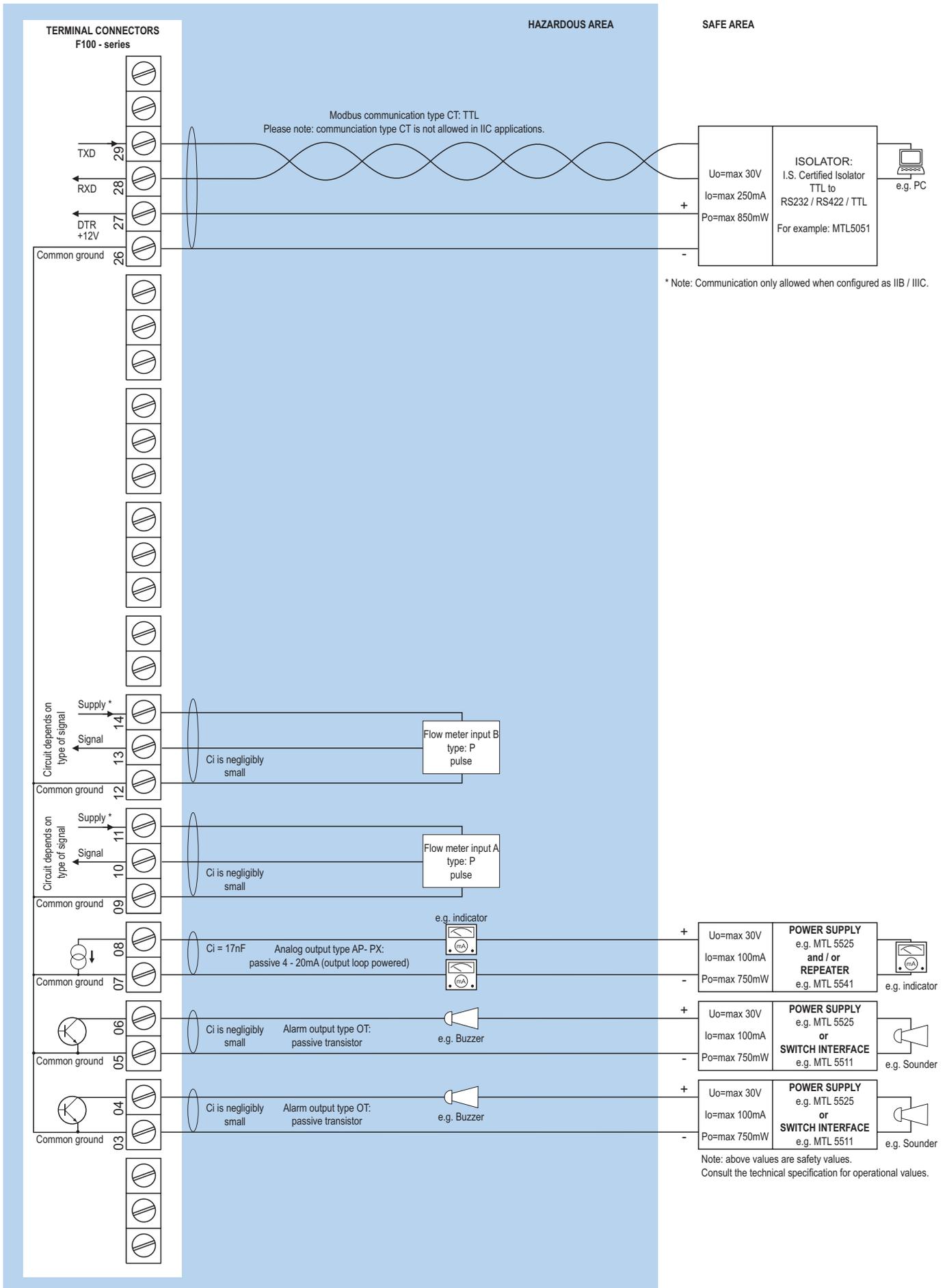
HAZARDOUS AREA **SAFE AREA**

TERMINAL CONNECTORS
F100 - series

Modbus communication type CT: TTL

TXD 29
RXD 28
DTR 27
+12V
Common ground 26

Uo=max 30V	ISOLATOR:
Io=max 250mA	I.S. Certified Isolator TTL to RS232 / RS422 / TTL
+	
Po=max 850mW	For example: MTL5051
-	

e.g. PC

Circuit depends on type of signal
Supply * 14
Signal 13
Common ground 12

Ci is negligibly small

Flow meter input B
type: P
pulse

+ Uo=max 30V
Io=max 100mA
- Po=max 750mW

POWER SUPPLY
For example
MTL 5525

Circuit depends on type of signal
Supply * 11
Signal 10
Common ground 09

Ci is negligibly small

Flow meter input A
type: P
pulse

+ Uo=max 30V
Io=max 100mA
- Po=max 750mW

POWER SUPPLY
For example
MTL 5525

e.g. indicator

08
07

Ci = 17nF

Analog output type AF:
passive floating 4 - 20mA

+ Uo=max 30V
Io=max 100mA
- Po=max 750mW

POWER SUPPLY
e.g. MTL 5525
and / or
REPEATER
e.g. MTL 5541

e.g. indicator

06
Common ground 05

Ci is negligibly small

Alarm output type OT:
passive transistor

e.g. Buzzer

+ Uo=max 30V
Io=max 100mA
- Po=max 750mW

POWER SUPPLY
e.g. MTL 5525
or
SWITCH INTERFACE
e.g. MTL 5511

e.g. Sounder

04
Common ground 03

Ci is negligibly small

Alarm output type OT:
passive transistor

e.g. Buzzer

+ Uo=max 30V
Io=max 100mA
- Po=max 750mW

POWER SUPPLY
e.g. MTL 5525
or
SWITCH INTERFACE
e.g. MTL 5511

e.g. Sounder

02
Main supply 01
Common ground 00

Due to analog output type AF, the unit has to be powered with battery type PC
or with external power supply type PD.

Power supply type PD: 16 - 30V DC

+ Uo=max 30V
Io=max 100mA
- Po=max 750mW

POWER SUPPLY
For example
MTL 5525

Note: above values are safety values.
Consult the technical specification for operational values.

* Note power supply type PD: the supply voltage to pulse sensors is maximum 8.7V (Uo=max 8.7V Io=max 25mA Po=max 150mW) and to analog sensors as connected to terminal 1 (internally linked).

Configuration example IIB / IIIC and IIC - F114-P-AP-(CT)-OT-PD-XI - Power supply 16 - 30V DC

TERMINAL CONNECTORS F100 - series

HAZARDOUS AREA

SAFE AREA

TXD — 29

Modbus communication type CT: TTL
Please note: communciation type CT is not allowed in IIC applications.

RXD — 28

DTR +12V — 27

Common ground — 26

ISOLATOR:
I.S. Certified Isolator
TTL to
RS232 / RS422 / TTL

For example: MTL5051

U_o=max 30V
I_o=max 250mA
P_o=max 850mW

+

−

e.g. PC

* Note: Communication only allowed when configured as IIB / IIIC.

Circuit depends on type of signal

Supply * — 11
Signal — 10
Common ground — 09

C_i is negligibly small

Flow meter input B
type: P
pulse

Circuit depends on type of signal

Supply * — 11
Signal — 10
Common ground — 09

C_i is negligibly small

Flow meter input A
type: P
pulse

TOTAL **C_o** OF ALL CONNECTED **ANALOG** APPARATUS IN **IIC** APPLICATIONS MAY NOT EXCEED **66nF** MINUS 17nF (17nF IS USED BY THE ANALOG OUTPUT SIGNAL TERMINAL 7 + 8).

08 — C_i = 17nF

Common ground — 07

e.g. indicator

Analog output type AP:
passive 4 - 20mA

06 — C_i is negligibly small — Alarm output type OT: passive transistor — e.g. Buzzer

Common ground — 05

POWER SUPPLY
e.g. MTL 5525
or
SWITCH INTERFACE
e.g. MTL 5511

+
U_o=max 30V
I_o=max 100mA
−
P_o=max 750mW

e.g. Sounder

04 — C_i is negligibly small — Alarm output type OT: passive transistor — e.g. Buzzer

Common ground — 03

POWER SUPPLY
e.g. MTL 5525
or
SWITCH INTERFACE
e.g. MTL 5511

+
U_o=max 30V
I_o=max 100mA
−
P_o=max 750mW

e.g. Sounder

02

Main supply — 01

Power supply type PD: 16 - 30V DC
(please note: two power supplies PD and battery (type PC) is NOT allowed in IIC applications).

POWER SUPPLY

For example
MTL 5525

+
U_o=max 30V
I_o=max 100mA
−
P_o=max 750mW

Common ground — 00

Note: above values are safety values.
Consult the technical specification for operational values.

* Note power supply type PD: the supply voltage to pulse sensors is maximum 8.7V (U_o=max 8.7V I_o=max 25mA P_o=max 150mW) and to analog sensors as connected to terminal 1 (internally linked).

Configuration example IIB / IIIC - F114-P-AF-CT-OT-(PC)-(PD)-XI - Power supply 16 - 30V DC or battery powered

TERMINAL CONNECTORS
F100 - series

HAZARDOUS AREA

SAFE AREA

Modbus communication type CT: TTL
Please note: communciation type CT is not allowed in IIC applications.

TXD 29
RXD 28
DTR +12V 27
Common ground 26

ISOLATOR:
I.S. Certified Isolator
TTL to
RS232 / RS422 / TTL

For example: MTL5051

Uo=max 30V
Io=max 250mA
Po=max 850mW

e.g. PC

* Note: Communication only allowed when configured as IIB / IIIC.

Circuit depends on type of signal
Supply * 14
Signal 13
Common ground 12

C_i is negligibly small

Flow meter input B
type: P
pulse

Circuit depends on type of signal
Supply * 11
Signal 10
Common ground 09

C_i is negligibly small

Flow meter input A
type: P
pulse

08
Common ground 07

C_i = 17nF   Analog output type AP- PX:
passive 4 - 20mA (output loop powered)

e.g. indicator

Uo=max 30V
Io=max 100mA
Po=max 750mW

POWER SUPPLY
e.g. MTL 5525
and / or
REPEATER
e.g. MTL 5541

e.g. indicator

06
Common ground 05

C_i is negligibly small   Alarm output type OT:
passive transistor

e.g. Buzzer

Uo=max 30V
Io=max 100mA
Po=max 750mW

POWER SUPPLY
e.g. MTL 5525
or
SWITCH INTERFACE
e.g. MTL 5511

e.g. Sounder

04
Common ground 03

C_i is negligibly small   Alarm output type OT:
passive transistor

e.g. Buzzer

Uo=max 30V
Io=max 100mA
Po=max 750mW

POWER SUPPLY
e.g. MTL 5525
or
SWITCH INTERFACE
e.g. MTL 5511

e.g. Sounder

Note: above values are safety values.
Consult the technical specification for operational values.

*   For pulse type inputs: V_{ref}: 1.2V/3.0V available.- NO power output, available I_{supply}: <1mA.
Note: using these ref. voltages at max. load, will reduce battery life significantly.

Display

Type	High intensity reflective numeric and alphanumeric LCD, UV-resistant.
Dimensions	90 x 40mm (3.5" x 1.6").
Digits	Seven 17mm (0.67") and eleven 8mm (0.31") digits. Various symbols and measuring units.
Refresh rate	User definable: fast, 1sec , 3sec, 15sec, 30sec, off.
Option ZB	Transflective LCD with white LED-backlight. Good readings in full sunlight and darkness.
Note ZB	Only available for safe area applications.

Ambient temperature

Safe areas	-40°C to +80°C (-40°F to +176°F).
Intrinsically Safe	-40°C to +70°C (-40°F to +158°F).
Dust, zone 20	-40°C to +50°C (-40°F to +122°F).

Terminal connections

Type	Removable plug-in terminal strip. Wire max. 1.5mm^2 and 2.5mm^2.

Data protection

Type	EEPROM backup of all settings. Backup of running totals every minute. Data retention at least 10 years.
Password	Configuration settings can be password protected.

Directives & Standards

EMC	Directive 2014/30/EU, FCC 47 CFR part 15.
Low voltage	Directive 2014/35/EU
RoHS	Directive 2011/65/EU
ATEX / IECEx	Directive 2014/34/EU, IEC 600079-0, IEC 60079-11.
IP & NEMA	EN 60529 & NEMA 250

Intrinsically Safe (Type XI)

ATEX	Gas: II 1 G Ex ia IIB/IIC T4 Ga. Dust: II 1 D Ex ia IIIC T$_{200}$ 100 °C Da.
IECEx	Gas: Ex ia IIC/IIB T4 Ga. Dust: Ex ia IIIC T$_{200}$ 100 °C Da.
Ambient Ta	-40°C to +70°C (-40°F to +158°F).
Dust, zone 20	-40°C to +50°C (-40°F to +122°F).

Explosion proof (Type XF)

ATEX/IECEx	Gas: II 2 G Ex db IIB+H2 T5 Gb. Dust: II 2 D Ex tb IIIC T80°C.
Protection	IP66
Type XF	Dimensions of enclosure: 300 x 250 x 200mm (11.8" x 9.9" x 7.9") L x H x D.
Weight	Appr. 15kg.

Enclosure

Window	Polycarbonate window.
Sealing	Silicone.
Control keys	Three industrial micro-switch keys. UV-resistant silicone keypad.

Panel mount enclosures

Dimensions	130 x 120 x 60mm (5.12" x 4.72" x 2.36") - W x H x D.
Panel cut-out	115 x 98mm (4.53" x 3.86") L x H.
Type HB	Die-cast aluminum panel mount enclosure IP65 / NEMA Type4X.
Weight	600 gr.
Type HC	GRP panel mount enclosure IP65 / NEMA Type4X, UV-resistant and flame retardant.
Weight	450 gr.
Type HSB	Die-cast stainless steel 316L IP67 / NEMA Type4X.
Weight	1150gr.

GRP wall / field mount enclosures

General	GRP wall/field mount enclosure IP67 / NEMA Type4X, UV-resistant and flame retardant.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
Weight	600 gr.
Type HD	Cable entry: no holes.
Type HE	Cable entry: 2 x Ø 16mm and 1 x Ø 20mm.
Type HF	Cable entry: 1 x Ø 22mm ($^7/_8$").
Type HG	Cable entry: 2 x Ø 20mm.
Type HH	Cable entry: 6 x Ø 12mm.
Type HJ	Cable entry: 3 x Ø 22mm ($^7/_8$").
Type HK	Flat bottom, cable entry: no holes.

Aluminum wall / field mount enclosures

General	Die-cast aluminum wall/field mount enclosure IP67 / NEMA Type4X with 2-component UV-resistant coating. Extended back cover available with undrilled preparation for direct meter mounting.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D. 130 x 120 x 90mm (5.12" x 4.72" x 3.54") - W x H x D.
Weight	1100 gr. / extended enclosure: 1310 gr.
Type HA	Cable entry: 2 x PG9 and 1 x M20.
Type HL	Cable entry: 2 x ½" NPT.
Type HM/HBM	Cable entry: 2 x M16 and 1 x M20.
Type HN	Cable entry: 1 x M20.
Type HO/HBO	Cable entry: 2 x M20.
Type HP	Cable entry: 6 x M12.
Type HT	Cable entry: 1 x ½" NPT.
Type HU/HBU	Cable entry: 3 x ½" NPT.
Type HV	Cable entry: 4 x M20.
Type HZ	Cable entry: no holes.

Stainless steel 316L wall / field mount enclosures

General	Die-cast stainless steel 316L wall / field mount enclosure with flat bottom. IP67 / NEMA Type4X.
Dimensions	130 x 120 x 75mm (5.12" x 4.72" x 2.95") - W x H x D.
Weight	2700 gr.
Type HSM	Cable entry: 2 x M16 + 1 x M20.
Type HSO	Cable entry: 2 x M20.
Type HSU	Cable entry: 3 x ½"NPT.

Signal inputs - Flowmeter

Type P	Coil / sine wave (HI: 20mVpp or LO: 80mVpp - sensitivity selectable), NPN/PNP, open collector, reed switch, Namur, active pulse signals 8 - 12 and 24V DC.
Frequency	Minimum 0Hz - maximum 6kHz for total and flow rate. Maximum frequency depends on signal type and internal low-pass filter. E.g. reed switch with low-pass filter: max. frequency 120Hz.
K-Factor	0.000010 - 9,999,999 with variable decimal position.
Low-pass filter	Available for all pulse signals.
Option ZF	coil sensitivity 10mVpp.

Signal outputs - Alarm output

Function	User defined: low, low-low, high, high-high or all alarms output.
Type OA	Three active 24V DC transistor outputs (PNP); max. 50mA per output (requires PD, PF, PM or PX). Requires min. 24V power supply.
Type OR	Two electro-mechanical relay outputs - isolated (N.O.) - max. switch power 230V AC - 0.5A (requires PF or PM) and one transistor output OT.
Type OT	Three passive transistor outputs (NPN) - not isolated. Max. 50V DC - 300mA per output.
Note	Intrinsically Safe applications: only two transistor outputs type OT available.

Signal outputs - Analog output

Function	Transmitting ratio, flow rate A or flow rate B.
Accuracy	10 bit. Error < 0.05%. Analog output signal can be scaled to any desired range.
Update time	Eight times per second.
Type AA	Active 4 - 20mA output (requires PD, PF, PM or PX).
Type AB	Active 0 - 20mA output (requires PD, PF, PM or PX).
Type AF	Passive floating 4 - 20mA output for Intrinsically Safe applications (requires XI + PD).
Type AI	Passive galvanically isolated 4 - 20mA output - also available for battery powered models.
Type AP	Passive 4 - 20mA output - not isolated. Unit will be loop powered.
Type AU	Active 0 - 10V DC output (requires PD, PF, PM or PX). Requires min. 12V power supply.

Signal outputs - Communication option

Function	Reading display information, reading / writing all configuration settings.
Protocol	Modbus ASCII / RTU.
Speed	1200 - 2400 - 4800 - 9600 baud.
Addressing	Maximum 255 addresses.
Type CB	RS232
Type CH	RS485 2-wire
Type CI	RS485 4-wire
Type CT	TTL Intrinsically Safe.

Mounting accessories

ACF02	Stainless steel wall mounting kit.
ACF05	Stainless steel pipe mounting kit (worm gear clamps not included).
ACF06	Two stainless steel worm gear clamps Ø 44 - 56mm.
ACF07	Two stainless steel worm gear clamps Ø 58 - 75mm.
ACF08	Two stainless steel worm gear clamps Ø 77 - 95mm.
ACF09	Two stainless steel worm gear clamps Ø 106 - 138mm.
ACF11	Swivel with 25° movement from center axis for direct flowmeter mounting: 1" NPT to 1/2" NPT.

Cable glands

ACF20	For HA enclosure, includes O-rings.
ACF25	For HE enclosure, includes locknuts and O-rings.
ACF26	For HF enclosure, includes locknuts and O-rings.
ACF27	For HG enclosure, includes locknuts and O-rings.
ACF28	For HH enclosure, includes locknuts and O-rings.
ACF29	For HJ enclosure, includes locknuts and O-rings.
ACF32	For HM enclosure, includes O-rings.
ACF33	For HN enclosure, includes O-rings.
ACF34	For HO enclosure, includes O-rings.
ACF35	For HP enclosure, includes O-rings.
ACF39	For HT enclosure, includes O-rings.
ACF40	For HU enclosure, includes O-rings.

Blind plugs

ACF50	For HA enclosure, includes O-rings.
ACF55	For HE enclosure, includes locknuts and O-rings.
ACF56	For HF enclosure, includes locknuts and O-rings.
ACF57	For HG enclosure, includes locknuts and O-rings.
ACF58	For HH enclosure, includes locknuts and O-rings.
ACF59	For HJ enclosure, includes locknuts and O-rings.
ACF62	For HM enclosure, includes O-rings.
ACF63	For HN enclosure, includes O-rings.
ACF64	For HO enclosure, includes O-rings.
ACF65	For HP enclosure, includes O-rings.
ACF69	For HT enclosure, includes O-rings.
ACF70	For HU enclosure, includes O-rings.

Intrinsically Safe isolators

ACG01	MTL5511 - One channel pulse or switch output transfer from hazardous area to safe area.
ACG02	MTL5525 - One channel power supply from safe area to hazardous area (e.g. to power the unit with PD or to power a switching or analog device in hazardous area).
ACG03	MTL5541 - One channel 4 - 20mA repeater from hazardous area to safe area.
ACG04	MTL 5051 - Bi-direction serial-data-isolator (for Modbus communication).
ACG05	MTL5516C - Two channel pulse or switch output transfer from hazardous area to safe area.
ACG06	MTL5513 - One channel pulse or switch output transfer from hazardous area to safe area.
ACG07	MTL5546Y - One channel isolated driver bringing 4 - 20mA from safe area to hazardous area, HART transparent, OCD.

Power requirements

Type AP	Analog output loop powered, 8 - 30V DC. Power consumption max 0.5 Watt.
Type PB	Long life Lithium battery - life-time depends upon settings and configuration - up to 5 years. (requires PD or PX)
Type PC	Intrinsically Safe long life lithium battery life-time depends upon settings and configuration - up to 5 years. (requires XI and PD or PX)
Type PD	8 - 24V AC / DC ± 10%. Power consumption max. 5W. Intrinsically Safe: 16 - 30V DC; power consumption max. 1 W.
Type PF	24V AC / DC ± 10%. Power consumption max. 15W.
Type PM	115 - 230V AC ± 10%. Power consumption max. 15W.
Type PX	8 - 30V DC. Power consumption max. 0.75W.
Type ZB	12 - 30V DC ± 10%. Power consumption max. 1.5W.
Note PB/PF/PM	Not available Intrinsically Safe.
Note PF/PM	The total consumption of the sensors and outputs may not exceed 400mA @ 24V.
Note XI	For Intrinsically Safe applications, consult the safety values in the certificate.

Sensor excitation

Type PB/PC/PX	3V DC for pulse signals and 1.2V DC for coil pick-up.
Note PB/PC/PX	This is not a real sensor supply. Only suitable for sensors with a very low power consumption like coils (sine wave) and reed-switches.
Type PD	1.2 / 3 / 8.2 / 12 / 24V DC - max. 50mA @ 24V DC. U_{max} sensor is 2V below U_{supply}
Type PD-XI	1.2 / 3 / 8.2V DC - max. 7mA @ 8.2V DC and mains power supply voltage (as connected to terminal 1).
Type PF / PM	1.2 / 3 / 8.2 / 12 / 24V DC - max. 400mA @ 24V DC.

Operator functions

Displayed info	• Ratio.
	• Low-low, Low, High and High-high ratio alarm value.
	• Flow rate and total A + B (can be hidden).
	• Alarm values can be set (or only displayed).
	• Total can be reset to zero by pressing the CLEAR-key twice.

Ratio

Digits	5 digits.
Units	1 - xxx or %.
Decimals	3.

Total

Digits	7 digits.
Units	L, m^3, GAL, USGAL, kg, lb, bbl, no unit.
Decimals	0 - 1 - 2 or 3.
Note	Total can be reset to zero.

Flow rate

Digits	7 digits.
Units	mL, L, m^3, Gallons, kg, Ton, lb, bl, cf, RND, ft^3, scf, Nm^3, Nl, igal - no units.
Decimals	0 - 1 - 2 or 3.
Time units	/sec - /min - /hr - /day.

Alarm values
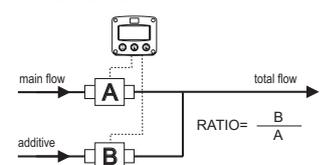
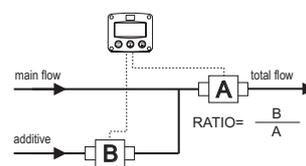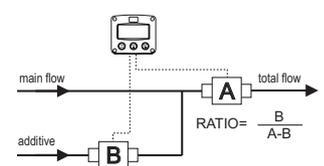|	
Digits	7 digits.
Units	According to selection for ratio.
Decimals	According to selection for ratio.
Type of alarm	Low, high, low-low or high-high ratio alarm. Includes alarm delay time and configurable alarm outputs.

Ratio

RATIO BETWEEN THE ADDITIVE AND THE TOTAL FLOW:

main flow — A — total flow; additive — B; $RATIO = \dfrac{B}{A+B}$

RATIO BETWEEN THE ADDITIVE AND THE MAIN FLOW:

main flow — A — total flow; additive — B; $RATIO = \dfrac{B}{A}$

RATIO BETWEEN THE ADDITIVE AND THE TOTAL FLOW:

main flow — A — total flow; additive — B; $RATIO = \dfrac{B}{A}$

RATIO BETWEEN THE ADDITIVE AND THE MAIN FLOW:

main flow — A — total flow; additive — B; $RATIO = \dfrac{B}{A-B}$

RATIO BETWEEN THE ADDITIVE AND THE TOTAL FLOW:

main flow — A — B — total flow; additive; $RATIO = \dfrac{B-A}{B}$

RATIO BETWEEN THE ADDITIVE AND THE MAIN FLOW:

main flow — A — B — total flow; additive; $RATIO = \dfrac{B-A}{A}$
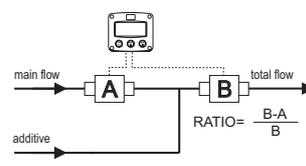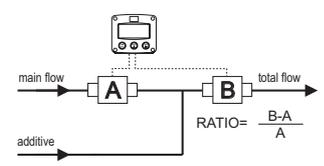
		Description
Model	**F114**	**Ratio monitor / totalizer with high / low alarms and analog output.**
Input	**P**	**Pulse input, e.g., coil, npn, pnp, namur, reed-switch.**
Analog output	AA	Active 4 - 20mA output - requires XX and PD, PF, PM or PX.
Analog output	AB	Active 0 - 20mA output - requires XX and PD, PF, PM or PX.
Analog output	AF	I.S. floating 4 - 20mA output - requires XI + PD.
Analog output	AI	Isolated 4 - 20 mA output - requires XX.
Analog output	**AP**	**Passive 4 - 20mA output, loop powered unit.**
Analog output	AU	Active 0 - 10V DC output - requires XX and PD, PF, PM or PX.
Communication	CB	Communication RS 232 - Modbus ASCII / RTU - requires XX.
Communication	CH	Communication RS 485 - 2wire - Modbus ASCII / RTU - requires XX.
Communication	CI	Communication RS 485 - 4wire - Modbus ASCII / RTU - requires XX.
Communication	CT	Intrinsically Safe TTL - Modbus ASCII / RTU - requires XI.
Communication	**CX**	**No communication.**
Enclosures	HB	Aluminum panel mount enclosure.
Enclosures	**HC**	**GRP panel mount enclosure.**
Enclosures	HSB	Stainless steel 316L panel mount enclosure.
Enclosures	HD	GRP field mount - Cable entry: no holes.
Enclosures	HE	GRP field mount - Cable entry: 2 x Ø 16mm & 1 x Ø 20mm.
Enclosures	HF	GRP field mount - Cable entry: 1 x Ø 22mm ($^7/_8$").
Enclosures	HG	GRP field mount - Cable entry: 2 x Ø 20mm.
Enclosures	HH	GRP field mount -Cable entry: 6 x Ø 12mm.
Enclosures	HJ	GRP field mount - Cable entry: 3 x Ø 22mm ($^7/_8$").
Enclosures	HK	GRP field mount - Flat bottom, cable entry: no holes.
Enclosures	HA	Aluminum field mount - Cable entry: 2 x PG9 + 1 x M20.
Enclosures	HL	Aluminum field mount - Cable entry: 2 x $^1/_2$"NPT.
Enclosures	HM	Aluminum field mount - Cable entry: 2 x M16 + 1 x M20.
Enclosures	HN	Aluminum field mount - Cable entry: 1 x M20.
Enclosures	HO	Aluminum field mount - Cable entry: 2 x M20.
Enclosures	HP	Aluminum field mount - Cable entry: 6 x M12.
Enclosures	HT	Aluminum field mount - Cable entry: 1 x $^1/_2$"NPT.
Enclosures	HU	Aluminum field mount - Cable entry: 3 x $^1/_2$"NPT.
Enclosures	HV	Aluminum field mount - Cable entry: 4 x M20.
Enclosures	HZ	Aluminum field mount - Cable entry: no holes
Enclosures	HBM	Extended Alu. field/meter mount - Cable entry: 2 x M16 + 1 x M20.
Enclosures	HBO	Extended Alu. field/meter mount - Cable entry: 2 x M20.
Enclosures	HBU	Extended Alu. field/meter mount - Cable entry: 3 x $^1/_2$"NPT.
Enclosures	HSM	Stainless steel 316L field mount - Cable entry: 2 x M16 + 1 x M20.
Enclosures	HSO	Stainless steel 316L field mount - Cable entry: 2 x M20.
Enclosures	HSU	Stainless steel 316L field mount - Cable entry: 3 x$^1/_2$"NPT.
Digital output	OA	Three active transistor outputs - requires XX and PD, PF, PM or PX.
Digital output	OR	Two mechnical relay outputs + one OT or OA - requires XX and PF or PM.
Digital output	**OT**	**Three passive transistor outputs.**
Power	PD	8 - 24V AC/DC + sensor supply - with XI: 16 - 30V DC.
Power	PF	24V AC/DC + sensor supply - requires XX.
Power	PM	115 - 230V AC + sensor supply - requires XX.
Power	**PX**	**Basic power supply 8 - 30V DC.**
Battery	PB	Additional lithium battery powered (optional) - requires XX and PD or PX.
Battery	PC	Additional lithium battery powered (optional) - Intrinsically safe - requires XI, and PD or PX .
Hazardous	XI	Intrinsically safe, according ATEX and IECEx.
Hazardous	XF	Ex d enclosure - 3 keys according ATEX and IECEx..
Hazardous	**XX**	**Safe area only, according CE / UKCA.**
Options	ZB	Backlight - requires XX.
Options	ZF	Coil input 10mVpp.
Options	**ZX**	**No options.**

The **bold** marked text contains the standard configuration: F114-P-AP-CX-HC-OT-PX-XX-ZX.