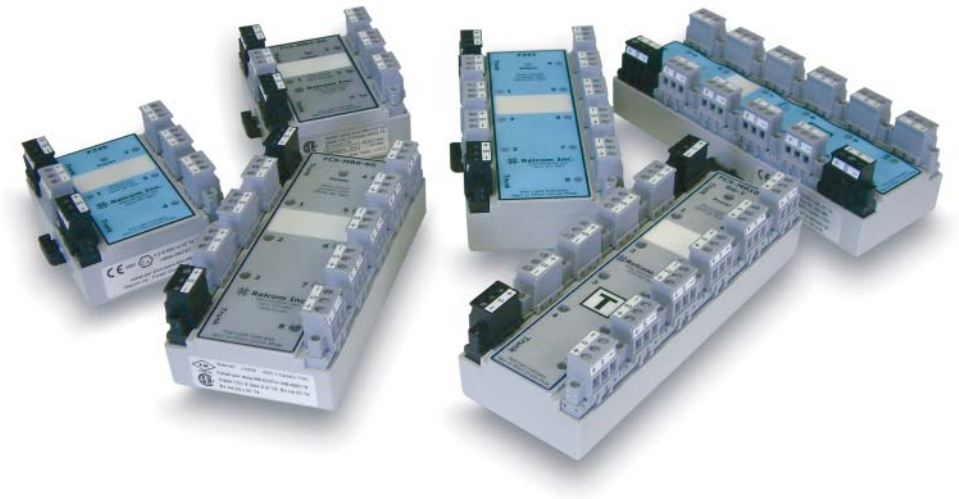
technical datasheet

Megablock Series

passive hubs for fieldbus networks



Megablocks are DIN-rail mounted passive hubs for FOUNDATION™ fieldbus networks. They connect several field devices to the network trunk cable and provide short circuit protection to the segment. Megablocks minimize hand wiring and allow individual devices to be added to and removed from the segment without disrupting network communication.

A green power LED on each unit indicates whether at least 9V dc is present. Megablocks are available in two, four, eight, ten and twelve drop versions. Multiple Megablocks are easily wired to one another to allow larger segments to be constructed.

The Megablock Terminator is easily wired to any Megablock to prevent signal reflection on the fieldbus segment. The Megablock Terminator is clearly marked for easy identification by field personnel. Megablocks are also available with an integral terminator making them ideal for a star or chickenfoot topology where several devices are connected at a single field junction box.

Each Megablock has two dedicated connections for the fieldbus home run or trunk cable. Trunk connections are easily identified by their black connectors. Separate numbered connections are provided for each spur drop.

Connections to the Megablock are made using pluggable screw terminal type connectors. This allows wire terminations to be made to the individual connectors which are then plugged into the Megablock. Devices can then be easily connected and disconnected during commissioning. After commissioning, retaining screws are tightened to secure each connector to the Megablock.

SpurGuard™ is a device-port, short circuit protection technique that minimizes susceptibility to single points of failure, The Megablocks are available with built-in SpurGuard™ protectors that prevent a short circuit in any of the individual transmitters or spur cable runs from bringing the entire fieldbus segment down. A red LED near each spur connection indicates that a spur is shorted and is in overcurrent mode.

Megablock hazardous area approvals permit installation in a variety of configurations in Zone 1 or 2 and Division 1 or 2. Within Zone 2 or Division 2 Megablocks may be installed as part of non-sparking (non-arcing) or energy-limited (non-incendive) circuits. Additionally, SpurGuard™ versions have energy-limited spur connections even if the trunk is classified as 'non-sparking', when fed for example from an F8xx or FPS-I fieldbus power supply.

Within Zone 1 and Division 1 Megablocks are designed for installation in intrinsically safe applications, and are compatible with FISCO or Entity-approved field instruments. An energy-limited or intrinsically safe fieldbus allows live connection/disconnection of the fieldbus without the need for a gas clearance certificate, which assists in commissioning, maintenance and system expansions. Alternatively, for applications using flameproof certified devices, the Megablocks are designed to meet the requirements for increased safety for installation in an Ex e junction box in Zone 1.

To select the Megablock for your application see the Ordering Information section of this document.

INSTALLATION

Megablocks can be mounted vertically or horizontally using 35 mm DIN rail within a suitable enclosure, such as a field junction box. Megablocks are removed from the DIN rail using a flat blade screwdriver to release the mounting platform. Use of DIN rail end stops is recommended to prevent sliding in vertical installations. Four, eight and ten port Megablocks have labeling areas so that segments can be easily identified according to plant standards.

MTL have a wide range of standard junction box designs for use with Megablocks. See the data sheet for the range of Process JBs.

Shown above is an example of a common Fieldbus segment topology. Eight field devices are connected to an eight-drop Megablock, which is mounted in a field junction box. One trunk connector on the Megablock is wired to a Megablock Terminator and the other to the segment trunk cable that leads to the control room or marshalling panel where the power supply and second terminator are located. The Megablock Terminator in the field has a normally open connection to earth ground that closes when surge conditions are detected.

GROUNDING

To prevent ground loops, a fieldbus segment should only be grounded at one point. This is usually done by grounding the cable shield at the control room end of the segment. If a permanent segment ground connection in the field is desired, this can be achieved by wiring the shield terminal on one of the Megablock trunk connectors to a suitable earth ground instead of wiring it to the shield terminal on the Megablock Terminator.

Fieldbus Connection System (FCS) wiring blocks are protected by U.S. Patents 6,366,437, 6,369,997 and 6,519,125.

SPECIFICATIONS

Mounting Requirements: 35mm DIN rail
Wire Capacity: 0.14 to 2.5mm2
Case material: Lexan Polycarbonate
Temperature Range: –45° to +70°C
Voltage Required to activate Power LED: 9.2V dc minimum

FCS-MBX MEGABLOCK

Power Consumption: 4.1mA maximum
Maximum Current Delivered to Spur: Not Limited
Trunk to Spur Voltage Drop: 0V

FCS-MBX-SG, F118 & F215 MEGABLOCK WITH SPURGUARD™

Power Consumption:
No SpurGuards™ tripped: 4.5mA
per SpurGuard™ tripped: 60mA
Maximum Current Delivered to Spur: 58.1mA ± 1.7mA

Trunk to Spur Voltage Drop (SpurGuard™ not tripped):
DC Impedance: 21Ω
Typical: 0.4V dc (17mA device current draw)

Trunk to Trunk Voltage Drop: 0V

F241 - F271 INTRINSICALLY SAFE MEGABLOCK WITH SPURGUARD™

Power Consumption:
with no SpurGuards™ tripped: 2mA (F241,F245),
3mA (F251,F259)
3.5mA (F271)
per SpurGuard™ tripped: 42mA
Maximum Current Delivered to Spur: 40.9mA ± 1.0mA

Trunk to Spur Voltage Drop (SpurGuard™ not tripped):
Typical: 0.1V dc (17mA device current draw)
DC Impedance: 5Ω

Trunk to Trunk Voltage Drop: 0V

F245-XE - F271-XE INCREASED SAFETY (EX EM) MEGABLOCK WITH SPURGUARD™

Power Consumption:
with no SpurGuards™ tripped: 2.9mA
per SpurGuard™ tripped: 41mA
Maximum Current Delivered to Spur: 40.9mA ± 1.0mA

Trunk to Spur Voltage Drop
SpurGuard™ not tripped: 0.2V maximum

Trunk to Trunk Voltage Drop: 0V

FCS-MBT & F100 MEGABLOCK TERMINATOR

Operating Temperature Range: –45° to +70°C
Common Mode Voltage Limit: 39V
Transient Mode Voltage Limit: 75V

PHYSICAL NETWORK

IEC 61158-2
Foundation™ fieldbus H1
Profibus PA

ORDERING INFORMATION

	No SpurGuard™	With SpurGuard™ short circuit protection		
	General Purpose Zone/Division 2 and Intrinsically Safe	General Purpose and Zone/Division 2	Zone/Division 1 Intrinsically Safe	Zone 1 Ex em
Megablocks				
2 way	FCS-MB2	FCS-MB2-SG	F241	-
4 way	FCS-MB4	FCS-MB4-SG	F245	F245-XE
4 way with internal Terminator	-	FCS-MB4-SG-T	F247	F247-XE
8 way	FCS-MB8	FCS-MB8-SG	F251	F251-XE
8 way with internal Terminator	-	FCS-MB8-SG-T	F253	F253-XE
10 way	-	FCS-MB10-SG	-	-
10 way with internal Terminator	FCS-MB10-T	FCS-MB10-SG-T	F259	F259-XE
10 way with switched Terminator	-	F118	F261	-
12 way	-	FCS-MB12-SG	-	-
12 way with internal terminator	-	FCS-MB12-SG-T	F271	F271-XE
12 way with switched Terminator	-	F215	-	-
Terminators†	F100* FBT1-IS	F100 FBT1-IS	FCS-MBT FBT1-IS	FCS-MBT-XE

* Use FCS-MBT for intrinsically safe applications

† See Terminators datasheet for full details

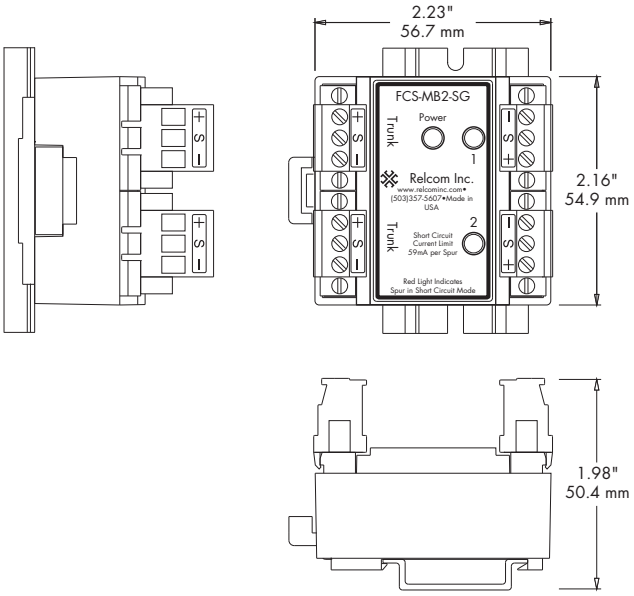
ACCESSORIES

Description	Part Number
Heavy Duty DIN rail end stop	ETL7000
35mm DIN Rail, 1 metre lengthw	THR7000
Process JB stainless steel, painted‡	FCS-75XX
Process JB carbon loaded GRP‡	FCS-85XX
Process JB stainless steel‡	FCS-95XX

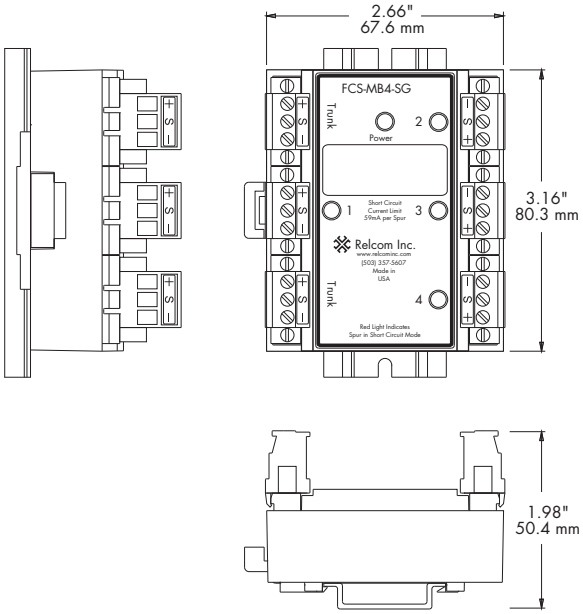
‡ See Process JB data sheets for further details

CASE DIMENSIONS

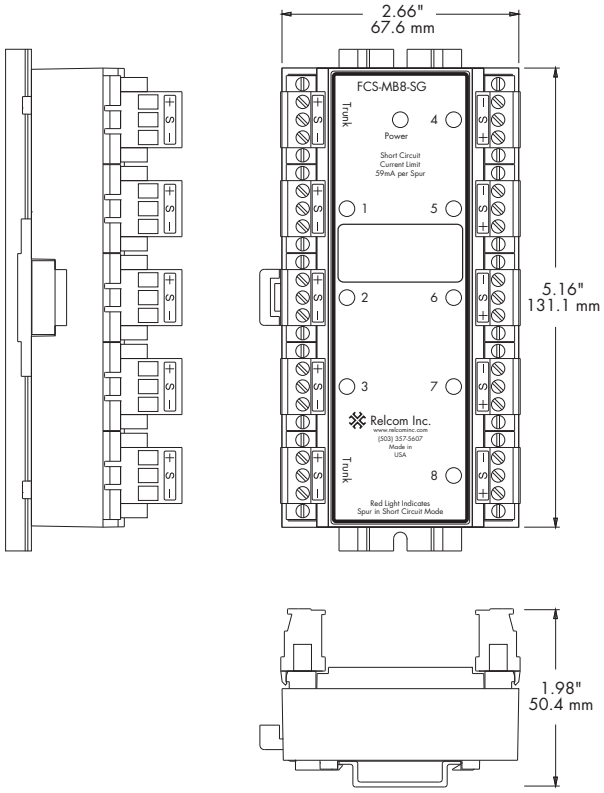
2-WAY MEGABLOCK



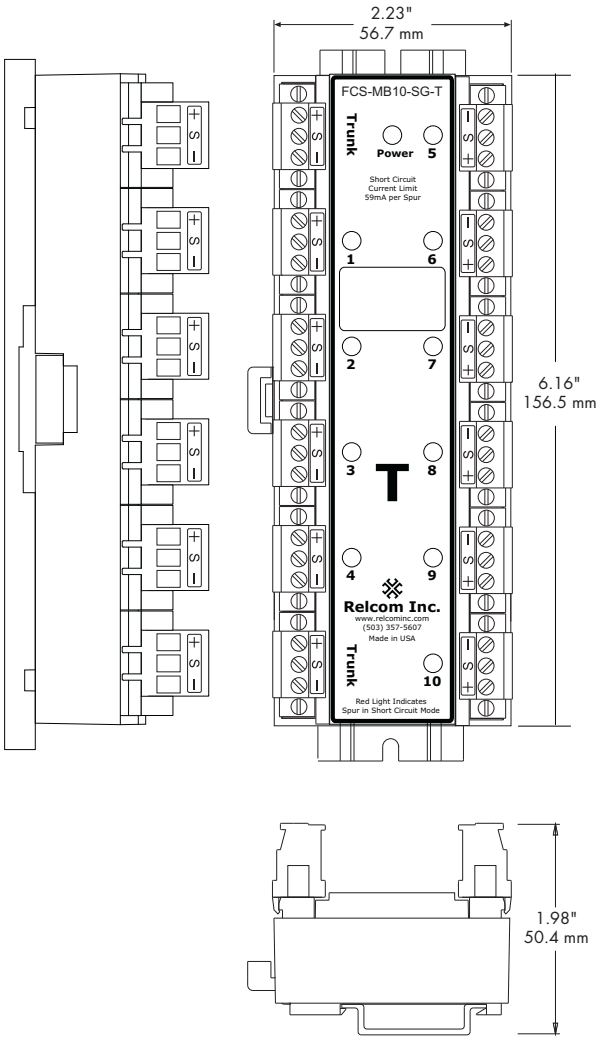
4-WAY MEGABLOCK



8-WAY MEGABLOCK



10-WAY MEGABLOCK

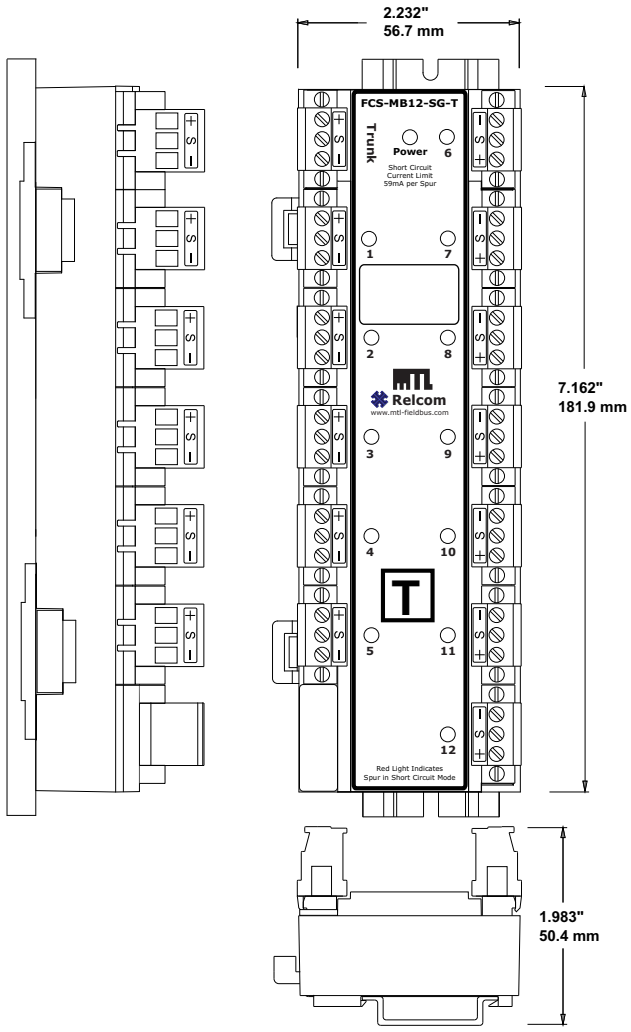


Note: Different Megablock versions have minor variations in labelling.

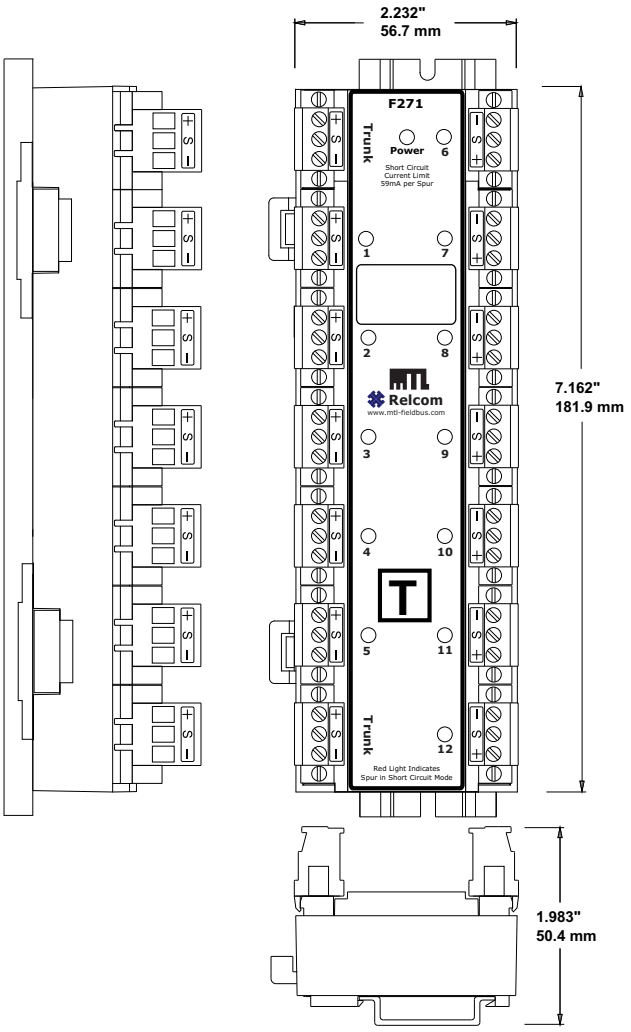
CASE DIMENSIONS (cont)

12-WAY MEGABLOCKS

FCS-MB12-SG-T



F215, F271, F271-XE



APPROVALS - *for full certification information visit www.mtl-inst.com/support/certificates/*

MODELS - F100, FCS-MBT, FCS-MB2, FCS-MB4, FCS-MB8, FCS-MB10-T

Country	Europe	USA	Canada	Canada		Europe	
Authority	ATEX (Category 3)	FM	CSA	CSA		LCIE	
Standard	EN 60079-0 : 2006 EN 60079-15 : 2005	3611	C22.2 No. 213 - M1987 CAN/CSA - E79-15-95	C22.2 No. 157-92 CAN/CSA - E79-11-95		EN60079-0 : 2006* EN60079-11 : 2007*	
Approved for	E II 3G Ex nA[L] IIC T4	Class I, Division 2 Groups A, B, C, D T4	Class I, Division 2 Groups A, B, C, D Ex nA IIC T4	Class I, Division 2 Groups A, B, C, D Ex ia IIC T4		E II 1G Ex ia IIC T4	
Certificate no.	RELC07ATEX1004X	3013269	1198909	1198909		LCIE02ATEX6212X	
				ENTITY	FISCO	ENTITY	FISCO
Apparatus parameters (Trunk)	Energy limited Ui=32V Ii=1.5A Ci=0 Li=0	Non-arcing	Non-arcing	Intrinsically safe Vmax, Ui=24V Imax, Ii=250mA Ci=0 Li=0 Pi=1.2W	Intrinsically safe Vmax, Ui=17.5V Imax, Ii=380mA Ci=0 Li=0 Pi=5.32W	Intrinsically safe Vmax, Ui=24V Imax, Ii=250mA Ci=0 Li=0 Pi=1.2W	Intrinsically safe Vmax, Ui=17.5V Imax, Ii=380mA Ci=0 Li=0 Pi=5.32W
Cable parameters (Spur)	Note 1	Non-arcing	Non-arcing	As trunk	As trunk	Uo = 24V Io = 250mA Co = 62nF Lo = 568µH Po = 1.2W Note 2	Uo = 17.5V Io = 380mA Co = 116nF Lo = 246µH Po = 5.32W Note 2

* the original LCIE Certificate used EN 50014:1997 + Amendments 1 & 2 and EN 50020:1994. We have determined that there are no technical differences (affecting the products) between these standards and the currently harmonized EN standards listed above.

Note 1: Spur is Energy-limited only if trunk is installed as Energy-limited, in which case spur field wiring parameters are as source of supply to trunk, and limited to 32V and 1.5A max.
Note 2: The figures quoted apply to IIC gas group. See certificate for parameter relating to groups IIB and IIA

MODELS - F118, F215, FCS-MB2-SG-[T], FCS-MB4-SG-[T], FCS-MB8-SG-[T], FCS-MB10-SG-[T], FCS-MB12-SG-[T]

Country	Europe	USA	USA	Canada	Canada
Authority	ATEX (Category 3)	FM	FM	CSA	CSA
Standard	EN 60079-0 : 2006 EN 60079-15 : 2005	3611	3611	C22.2 No. 213 - M1987 CAN/CSA - E79-15-95 IEC 60079-15	C22.2 No. 213 - M1987 CAN/CSA - E79-15-95
Approved for	E II 3G Ex nA[L] IIC T4	Class I, Division 2 Groups A, B, C, D T4	Class I, Division 2 Groups A, B, C, D T4	Class I, Division 2 Groups A, B, C, D Ex nA [nL] IIC T4	Class I, Division 2 Groups A, B, C, D Ex nA IIC T4
Certificate no.	RELC07ATEX1001X	3013269	3013852	1280795	1198909
Apparatus parameters (Trunk)	Energy limited Ui=32V Ii=1.5A Ci=0 Li=0	Non-arcing	Non-arcing	Non-arcing	Non-arcing
Cable parameters (Spur)	Energy limited Uo=32V Io=60mA Co=170nF Lo=1.26mH Note 2	Non-arcing	Non-incendive Voc=32V Isc=60mA Ca=170nF La=1.26mH	Non-incendive Voc=32V Isc=60mA Ca=170nF La=1.26mH	Non-arcing

Note 2: Trunk may be installed as Energy-limited or Non-sparking circuit; Spur is Energy-limited in either case.

APPROVALS - *for full certification information visit www.mtl-inst.com/support/certificates/*

MODELS - F241, F245, F247, F251, F253, F259, F261, F271†

Country	Europe		USA		USA & Canada		International	
Authority	**KEMA**		**FM**		**CSA**		**IECEx**	
Standard	EN 60079-0 : 2006* EN 60079-11 : 2007*		3610		C22.2 No. 0 - M1982CAN/ C22.2 No. 157-92 CAN/CSA - E79-0-95 CAN/CSA - E79-11-95 FM3600, FM3610		IEC60079-0 : 2000 IEC60079-11 : 1999	
Approved for	E II 2G Ex ia IIC T4		IS/I/1/ABCD/T4 Ta=70ºC I/0/AEx ia IIC T4 Ta=70ºC		Class I, Division 2 Groups A, B, C, D Ex ia IIC T4		Ex ia IIC T4	
Certificate no.	KEMA03ATEX1555X		3020445		1422741		IECExCSA06.0003X	
Apparatus parameters (Trunk)	ENTITY Intrinsically safe Ui ≤ 24V Ii ≤ 250mA Ci = 0 Li = 0 Pi ≤ 1.2W	FISCO Intrinsically safe Ui ≤ 17.5V Ii ≤ 380mA Ci = 0 Li = 0 Pi ≤ 5.32W	ENTITY Intrinsically safe Vmax = 24V Imax = 250mA Ci = 0 Li = 0 Pi =1.2W	FISCO Intrinsically safe Vmax =17.5V Imax = 380mA Ci = 0 Li = 0 Pi = 5.32W	ENTITY Intrinsically safe Vmax, Ui = 24V Imax, Ii = 250mA Ci = 0 Li = 0 Pi =1.2W	FISCO Intrinsically safe Vmax, Ui =17.5V Imax, Ii = 380mA Ci = 0 Li = 0 Pi = 5.32W	ENTITY Intrinsically safe Ui = 24V Imax, Ii = 250mA Ci = 0 Li = 0 Pi =1.2W	FISCO Intrinsically safe Ui =17.5V Imax, Ii = 380mA Ci = 0 Li = 0 Pi = 5.32W

* the original KEMA Certificate used EN 50014:1997 and EN 50020:2002. We have determined that there are no technical differences (affecting the products) between these standards and the currently harmonized EN standards listed above.

† Model F271 currently has only KEMA approval to the standards indicated.

MODELS - F245-XE, F247-XE, F251-XE, F253-XE, F259-XE, F271-XE, FCS-MBT-XE

Country	Europe
Authority	**KEMA**
Standard	EN 60079-0 : 2004 EN 60079-7 : 2001 EN 60079-18 : 2004
Approved for	E II 2 G Ex em IIC T4
Certificate no.	KEMA05ATEX2006
Trunk wiring parameters	Rated voltage 30V DC Rated current 1.5A

MODEL - FBT1-IS

Country	Europe		US	
Authority	**BASEEFA**		**FM**	
Standard	EN50014(1997) +A1 & A2 EN50020 (2002)		3610 Entity	
Approved for	II 1G EEx ia IIC T4 (-40ºC ≤ Ta ≤ +70ºC)		IS/I/1/ABCD/T4 Ta=70ºC I/0/AEx ia IIC T4 Ta=70ºC	
Certificate no.	Baseefa 02ATEX0042		3017464	
Apparatus parameters (Trunk)	ENTITY Intrinsically safe Ui = 30V Ii = 250mA Ci = 0 Li = 0 Pi = 1.2W	FISCO Intrinsically safe Ui = 17.5V Ii = 380mA Ci = 0 Li = 0 Pi = 5.32W	ENTITY Intrinsically safe Vmax = 30V Imax = 250mA Ci = 0 Li = 0 Pi =1.2W	FISCO Intrinsically safe Vmax =17.5V Imax = 380mA Ci = 0 Li = 0 Pi = 5.32W

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