

## TUFFY® T3

### Side Mounting Level Controls

Tuffy liquid level switches are float actuated devices designed for horizontal mounting in a tank or vessel through threaded or flanged pipe connections. The compact size allows for installation in small vessels, while its many features provide a variety of application uses. The single switch mechanism is available in SPDT or DPDT forms on units designed for adjustable, narrow or wide differential and interface service.

#### FEATURES

- \* Maximum Process temperature: +482 °C (900 °F).  
Minimum Process temperature: -55 °C (-65 °F).
- \* Maximum process Pressure: 149 bar (2160 psi).
- \* Specific gravities as low as 0.4.
- \* Wetted parts in 316/316L (1.4401/1.4404) or Hastelloy C (2.4819).
- \* Available as:
  - Flanged
  - Threaded
  - Flanged or sealed cage mounted.

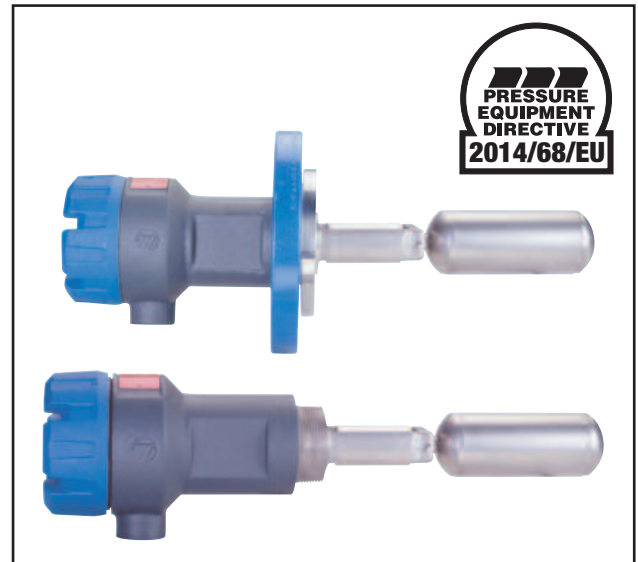
#### MODELS

- \* Narrow differential switch (for alarm functions).
- \* Wide adjustable differential switch (for control functions).
- \* Interface switch (detection of interface level between liquids).
- \* External cages.
- \* Compact pneumatic narrow differential switch.

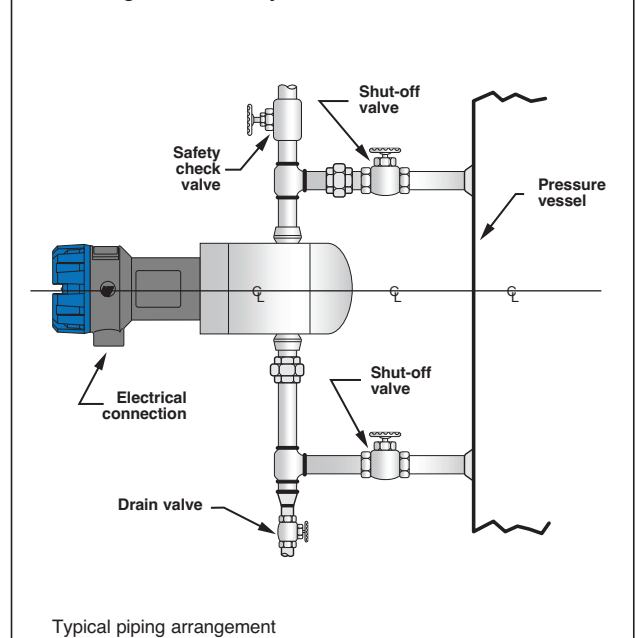
#### APPLICATIONS

- \* Sour service (NACE).
- \* High/low alarm.
- \* Single pump control.
- \* Day storage tanks.
- \* Corrosive processes.
- \* Process vessels.
- \* Boiler low water cut-off.
- \* Interface level.
- \* Dirty process high level w/offset.
- \* Installations in hazardous area.

#### Compact and cost effective



#### External cage mounted Tuffy



#### AGENCY APPROVALS

Agency	Approvals (only for T3-series)
ATEX/IEC	ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb, flame-proof enclosure ATEX II 1 G / IECEx Ex ia IIC T6 Ga, intrinsically safe
FM/CSA ①	Explosion proof

① Consult factory for proper part numbers

## SWITCH MECHANISMS

TUFFY® T3 is available with a selection of switch modules that vary in switch rating (Amp) and max process temperature allowance. The max temperature is dependent upon the housing material selected. Consult table below, before selecting the proper module in the order number structure.

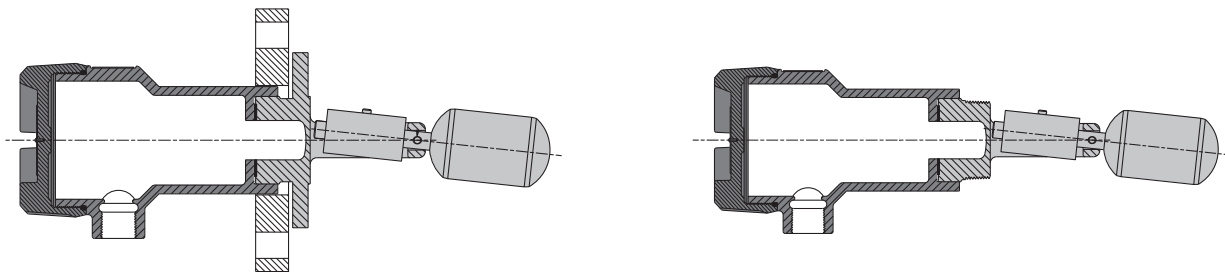
Code	Contacts and type	Electric switch rating				Process temperature range @ 40 °C (100 °F) ambient temp.	
		V AC		V DC		Cast Iron	Cast Aluminium
		120	240	24	120		
0	SPDT with silver contacts	10.0	10.0	6.0	0.6	-40 °C to +400 °C (-40 °F to +750 °F)	-40 °C to +345 °C (-40 °F to +650 °F)
1	DPDT with silver contacts	10.0	10.0	6.0	0.6	-40 °C to +400 °C (-40 °F to +750 °F)	-40 °C to +345 °C (-40 °F to +650 °F)
2	SPDT with gold plated contacts	0.1	-	0.1	-	-40 °C to +190 °C (-40 °F to +375 °F)	-40 °C to +160 °C (-40 °F to +325 °F)
3	DPDT with gold plated contacts	0.1	-	0.1	-	-40 °C to +190 °C (-40 °F to +375 °F)	-40 °C to +160 °C (-40 °F to +325 °F)
4	HS SPDT with silver contacts	1.0	1.0	3.0	0.5	-55 °C to +400 °C (-65 °F to +750 °F)	-55 °C to +345 °C (-65 °F to +650 °F)
6	HS SPDT with gold plated contacts	0.5	0.5	0.5	0.5	-55 °C to +400 °C (-65 °F to +750 °F)	-55 °C to +345 °C (-65 °F to +650 °F)
7	HS SPDT with silver contacts	2.5	-	4.0	0.3	up to +482 °C (900 °F)	-

## HOUSINGS

TUFFY® T3 is available with an IP 66 weatherproof housing in anti corrosive coated cast iron or cast aluminium. The housings are built to meet explosion proof requirements according to ATEX, FM or CSA norms.

The wetted parts are available in 316/316L (1.4401/1.4404) or Hastelloy C (2.4819).

All dark-grey coloured parts of below drawing follow the materials as per housing selection, all light-grey coloured parts follow the materials as per float selection (wetted parts).



## PHYSICAL SPECIFICATIONS: TUFFY® T3

Description	Specification
Measured variable	Liquid level
Physical range	Narrow differential: 13 mm (0.5") Adjustable differential: up to 464 mm (18.26") Interface Service Differential: 44 mm (1.72") Interface: min S.G. difference between both liquids: 0,1
Ambient temperature	-40 °C to +70 °C (-40 °F to +160 °F)
Process temperature	From -55 °C (-65 °F) up to +482 °C (900 °F) depending switch/housing selection
Process pressure	Standard models: up to 49,6 bar (720 psi) High pressure models: up to 149 bar (2160 psi)
Wetted parts	316/316L (1.4401/1.4404) or Hastelloy C (2.4819)
Flange materials	Carbon steel 316/316L (1.4401/1.4404) or Carbon steel with 316/316L (1.4401/1.4404) cladding Hastelloy C (2.4819) or Carbon steel with Hastelloy C (2.4819) cladding
Housing materials	Cast aluminium or cast iron

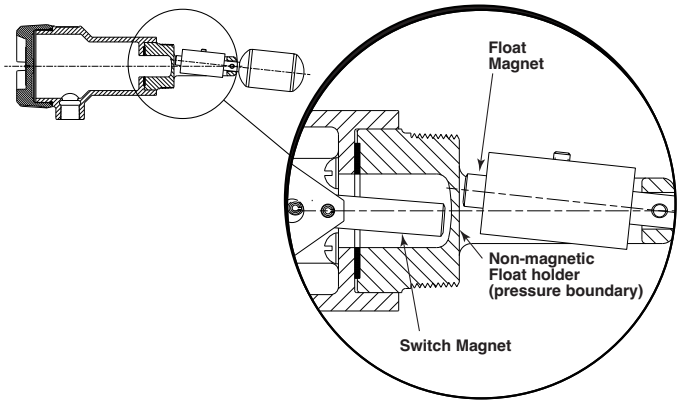
## ELECTRICAL SPECIFICATIONS

Description	Specification
Switch ratings	Up to 10 A @ 240 V AC Up to 6.0 A @ 24 V DC
Signal output	Single SPDT or single DPDT contacts
Switch types	Dry contact with silver or gold plated contacts Hermetically sealed for corrosive environment
Approvals	ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb, flameproof enclosure ATEX II 1 G / IECEx Ex ia IIC T6 Ga, intrinsically safe NEMA 4X/7/9, Class 1, Div 1, Groups B, C & D
Cable entry	3/4" NPT or M20 x 1,5

## PRINCIPLE OF OPERATION

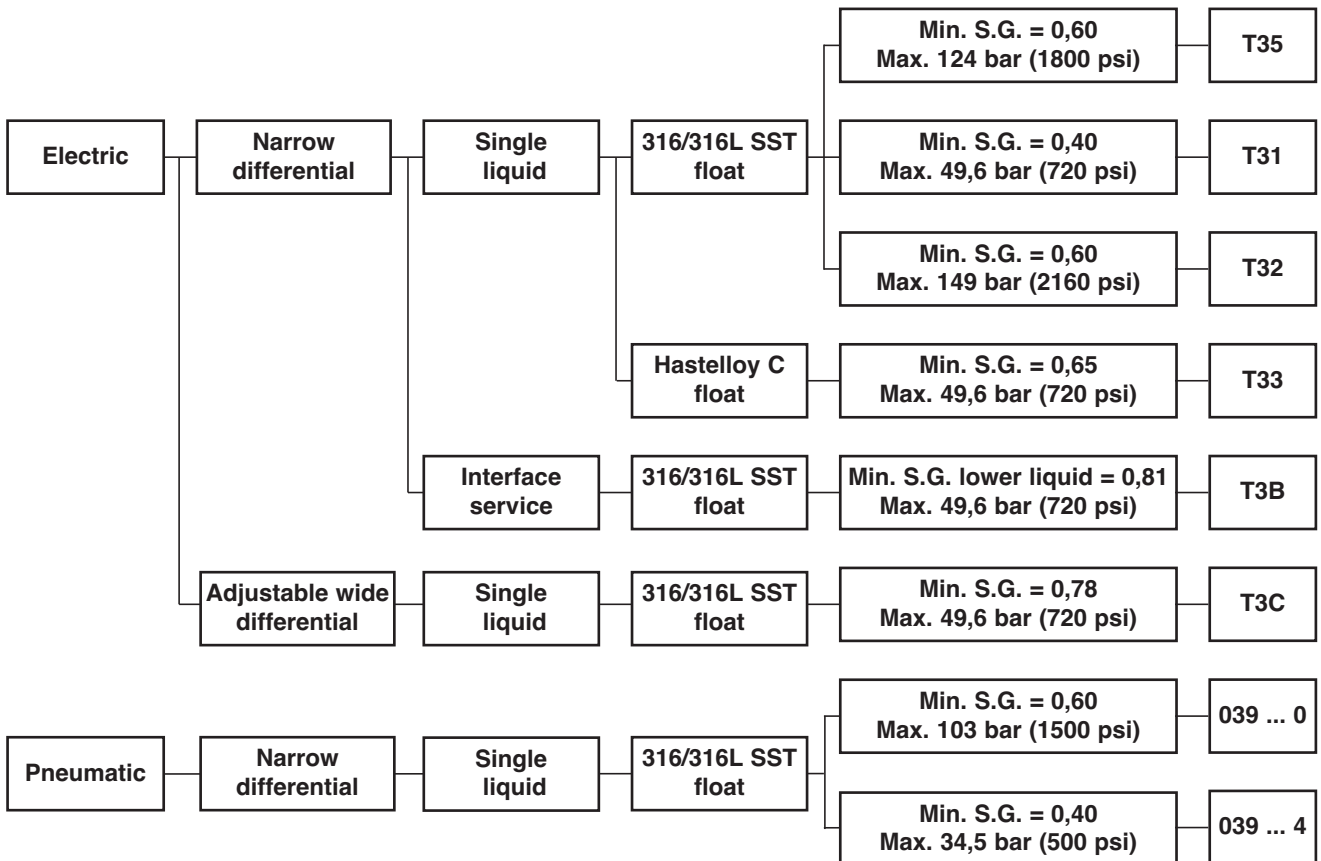
The Tuffy achieves switching action through the use of a magnetic switch mechanism and a magnet attached to the float assembly. Separating the two magnets is a non-magnetic pressure barrier.

As the liquid level changes, the float, and therefore the float magnet, moves. The float and switch magnets repel each other causing movement of the switch mechanism, tripping the switch and making or breaking an electrical circuit.



## SELECTION DATA

- Narrow Differential: Switch differential of approximately 13 mm (0.5") (44 mm (1.72") on interface unit), for actuation of an alarm or system shutdown.
- Interface Service: Switch to detect the interface between two liquids with SGs that differ by at least 0,1 kg/dm<sup>3</sup>.
- Single Liquid: Switch to detect the top of layer of a single liquid with no other liquid above it.
- Adjustable Differential: Wide switch differential from approximately 35 (1.36") to 464 (18.26"), which may be adjusted in the field by repositioning pins on the pivot plate.

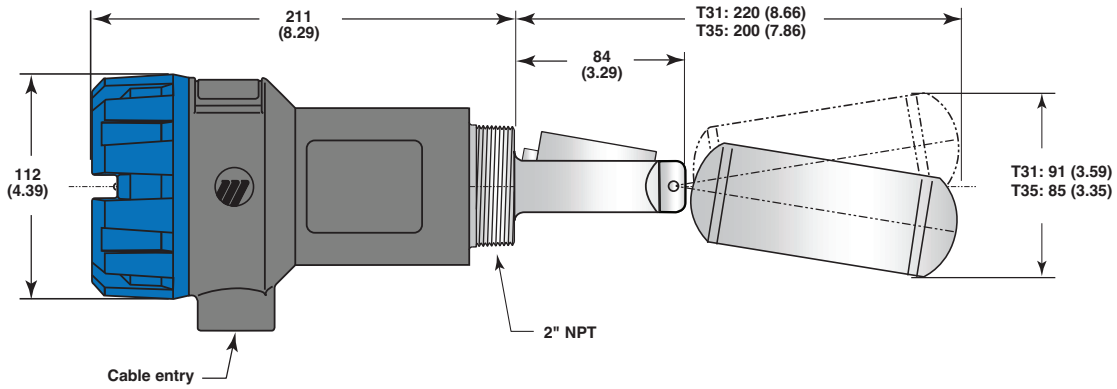


## QUICK RESPONSE CELL (QRC)

Several models are available for extra quick shipment, within max. 15 days after factory receipt of purchase order, through the Quick Response Cell (QRC). To take advantage of QRC, simply match the green model number codes.

QRC delivery is limited to a maximum of 10 units per order. Contact your local representative for lead times on larger volume orders, as well as other products and options.

**T31 AND T35: THREADED NARROW DIFFERENTIAL**  
**DIMENSIONS in mm (inches)**



Process connection: 2" NPT  
 Level Differential: 13 mm (0,5")

**1 - 7 | BASIC MODEL NUMBER**

T 3 1 - 0 0 2 N	Threaded Tuffy with 316/316L (1.4401/1.4404) float - min. S.G. 0,4 / max 49,6 bar (720 psi)
T 3 5 - 0 0 2 N	Threaded Tuffy with 316/316L (1.4401/1.4404) float - min. S.G. 0,6 / max 124 bar (1800 psi)

**8 | DESIGN CODE (All wetted parts in 316/316L (1.4401/1.4404))**

B	Standard design
F	ASME B31.3 design
K	NACE design
P	NACE & ASME B31.3 design

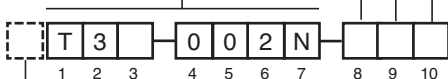
**9 | SWITCH TYPE (see table on page 2 for full details)**

0	SPDT with silver contacts
1	DPDT with silver contacts
2	SPDT with gold plated contacts
3	DPDT with gold plated contacts
4	Hermetically sealed, SPDT with silver contacts
6	Hermetically sealed, SPDT with gold plated contacts
7	High temperature, hermetically sealed, SPDT with silver contacts

**10 | HOUSING MATERIALS AND CABLE ENTRY**

Consult factory for proper part numbers for FM/CSA approved units

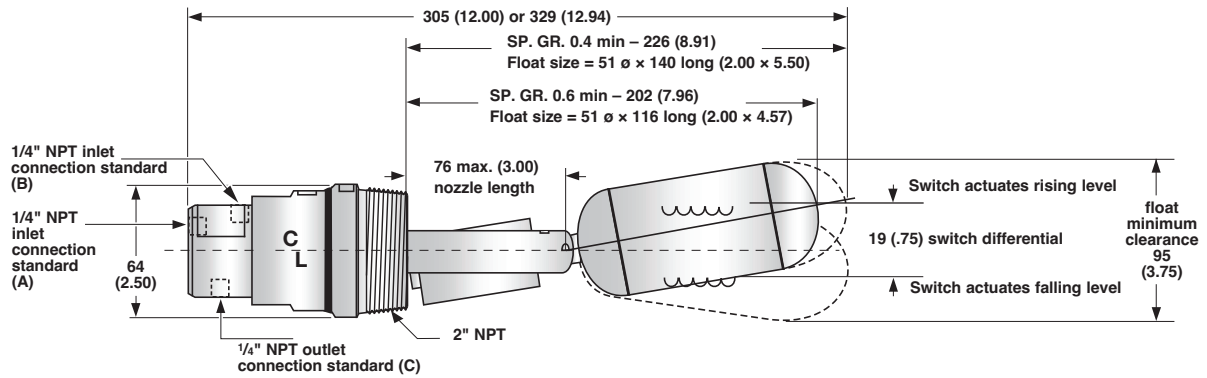
1	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
2	Cast iron, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
3	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
4	Cast iron, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
M	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
N	Cast iron, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
P	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
R	Cast iron, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga



**complete order code for threaded TUFFY®**

X = product with a specific customer requirement

**039: PNEUMATIC COMPACT TUFFY (Narrow differential)**  
**DIMENSIONS in mm (inches)**



Process connection: 2" NPT  
 Temperature range: -40 °C (-40 °F) up to 150 °C (300 °F)  
 Supply pressure: vacuum – 13,8 bar (200 psi)  
 Maximum leakage rate: 14.16 l/h (0.5 SCFH) @ 6,9 bar (100 psi)  
 Maximum air flow: 3,40 m<sup>3</sup>/h (120 SCFH) @ 6,9 bar (100 psi)  
 Wetted parts: 316/316L SST (1.4401/1.4404) including NACE and ASME B31.3  
 Housing material: 316 stainless steel

**1 - 9 | BASIC MODEL NUMBER**

0 3 9 - 6 0 0 0 - 1 0	TuffY level switch with non-bleed pneumatic switch
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**10 | SPECIFIC GRAVITY – PRESSURE RATING**

0	0,60 min. specific gravity – maximum 103 bar (1500 psi)
4	0,40 min. specific gravity – maximum 34,5 bar (500 psi)



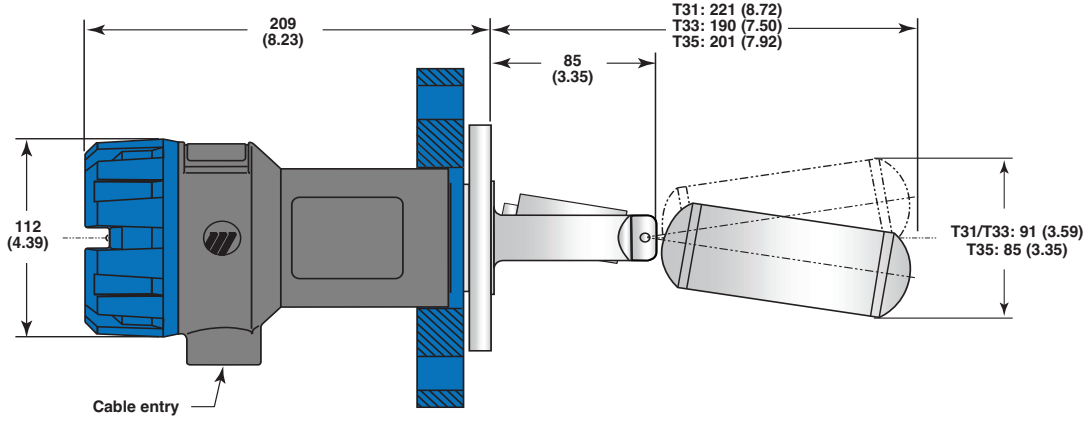
X = product with a specific customer requirement

**OPTIONAL MOUNTING FLANGES for 2" NPT threaded TUFFY models**

Raised face mounting flanges are available in the sizes and materials shown below.  
 Consult factory (C/F) for additional flange sizes.

ASME RF Flange		Part number	
Size	Rating	316/316L (1.4401/1.4404)	Carbon steel
3"	150 lbs	004-6820-024	004-6820-001
4"		004-6820-025	004-6820-007
6"		004-6820-026	004-6820-016
3"	300 lbs	004-6820-005	004-6820-002
4"		004-6820-011	004-6820-008
6"		004-6820-033	004-6820-029
3"	600 lbs	004-6820-006	004-6820-003
4"		004-6820-012	004-6820-009
6"		004-6820-034	004-6820-030

**T31, T33 AND T35: FLANGED NARROW DIFFERENTIAL**  
**DIMENSIONS in mm (inches)**



Process connection: up to 600 lbs ASME / PN 63 flanges  
 Level differential: 13 mm (0,5")

**1 - 5 | BASIC MODEL NUMBER**

T 3 1 - 0 0	Flanged Tuffly with 316/316L (1.4401/1.4404) float - min. S.G. 0,4 / max 49,6 bar (720 psi)
T 3 3 - 0 0	Flanged Tuffly with Hastelloy C (2.4819) float - min. S.G. 0,65 / max 49,6 bar (720 psi)
T 3 5 - 0 0	Flanged Tuffly with 316/316L (1.4401/1.4404) float - min. S.G. 0,6 / max 124 bar (1800 psi)

**6 - 7 | PROCESS CONNECTION – ASME Flanges**

3 A	3"	150 lbs RF ASME Flange
3 B	3"	300 lbs RF ASME Flange
3 C	3"	600 lbs RF ASME Flange ①
4 A	4"	150 lbs RF ASME Flange
4 B	4"	300 lbs RF ASME Flange
4 C	4"	600 lbs RF ASME Flange ①
5 A	5"	150 lbs RF ASME Flange
5 B	5"	300 lbs RF ASME Flange
6 A	6"	150 lbs RF ASME Flange
6 B	6"	300 lbs RF ASME Flange

① Available only with Model T35

**PROCESS CONNECTION – EN Flanges**

A 1	DN 80, PN 16	EN 1092-1 Type B1
A 2	DN 80, PN 25/40	EN 1092-1 Type B1
A 3	DN 80, PN 63	EN 1092-1 Type B2 ①
B 1	DN 100, PN 16	EN 1092-1 Type B1
B 2	DN 100, PN 25/40	EN 1092-1 Type B1
B 3	DN 100, PN 63	EN 1092-1 Type B2 ①
C 1	DN 125, PN 16	EN 1092-1 Type B1
C 2	DN 125, PN 25/40	EN 1092-1 Type B1
C 3	DN 125, PN 63	EN 1092-1 Type B2 ①
D 1	DN 150, PN 16	EN 1092-1 Type B1
D 2	DN 150, PN 25/40	EN 1092-1 Type B1
D 3	DN 150, PN 63	EN 1092-1 Type B2 ①

**8 | DESIGN CODE AND FLANGE MATERIAL**

Model	Design codes				Flange material
	Standard	ASME B31.3	NACE	ASME B31.3 & NACE	
T31/T35	1	2	–	–	Carbon steel
	A	E	J	N	Carbon steel w. 316/316L cladding
	B	F	K	P	316/316L stainless steel
T33	C	G	L	R	Carbon steel w. Hastelloy C cladding
	D	H	M	T	Hastelloy C (2.4819)

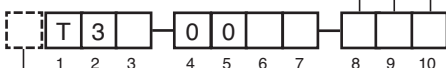
**9 | SWITCH TYPE (see table on page 2 for full details)**

0	SPDT with silver contacts
1	DPDT with silver contacts
2	SPDT with gold plated contacts
3	DPDT with gold plated contacts
4	Hermetically sealed, SPDT with silver contacts
6	Hermetically sealed, SPDT with gold plated contacts
7	High temperature, hermetically sealed, SPDT with silver contacts

**10 | HOUSING MATERIALS AND CABLE ENTRY**

Consult factory for proper part numbers for FM/CSA approved units

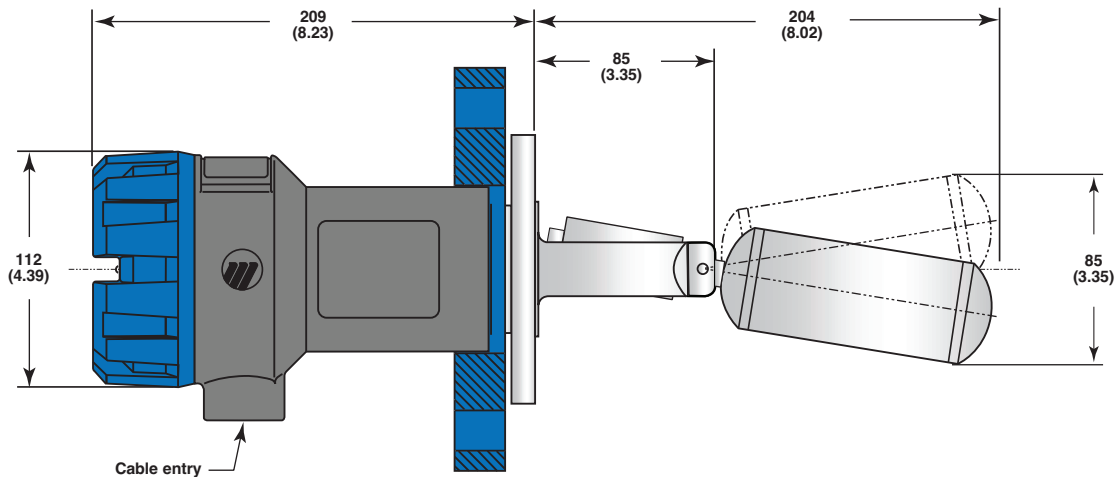
1	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
2	Cast iron, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
3	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
4	Cast iron, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
M	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
N	Cast iron, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
P	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
R	Cast iron, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga



**complete order code for flanged TUFFY®**

# T32: FLANGED HIGH PRESSURE NARROW DIFFERENTIAL

DIMENSIONS in mm (inches)



Process connection: up to 900 lbs ASME / PN 160 flanges  
 Level differential: 13 mm (0,5")

## 1 - 5 | BASIC MODEL NUMBER

T	3	2	-	0	0	Flanged Tuffy with 316/316L (1.4401/1.4404) float - min. S.G. 0,6 / max 149 bar (2160 psi)
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## 6 - 7 | PROCESS CONNECTION – ASME Flanges

3	D	3"	900 lbs RF ASME Flange
4	D	4"	900 lbs RF ASME Flange

## PROCESS CONNECTION – EN Flanges

A	4	DN 80, PN 100	EN 1092-1 Type B2
A	5	DN 80, PN 160	EN 1092-1 Type B2
B	4	DN 100, PN 100	EN 1092-1 Type B2
B	5	DN 100, PN 160	EN 1092-1 Type B2
C	4	DN 125, PN 100	EN 1092-1 Type B2
D	4	DN 150, PN 100	EN 1092-1 Type B2

## 8 | DESIGN CODE AND FLANGE MATERIAL

Design codes				Flange material
Standard	ASME B31.3	NACE	ASME B31.3 & NACE	
1	2	-	-	Carbon steel
A	E	J	N	Carbon steel w. 316/316L cladding
B	F	K	P	316/316L stainless steel

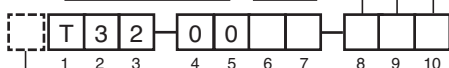
## 9 | SWITCH TYPE (see table on page 2 for full details)

0	SPDT with silver contacts
1	DPDT with silver contacts
2	SPDT with gold plated contacts
3	DPDT with gold plated contacts
4	Hermetically sealed, SPDT with silver contacts
6	Hermetically sealed, SPDT with gold plated contacts
7	High temperature, hermetically sealed, SPDT with silver contacts

## 10 | HOUSING MATERIALS AND CABLE ENTRY

Consult factory for proper part numbers for FM/CSA approved units

1	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
2	Cast iron, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
3	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
4	Cast iron, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
M	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
N	Cast iron, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
P	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
R	Cast iron, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga

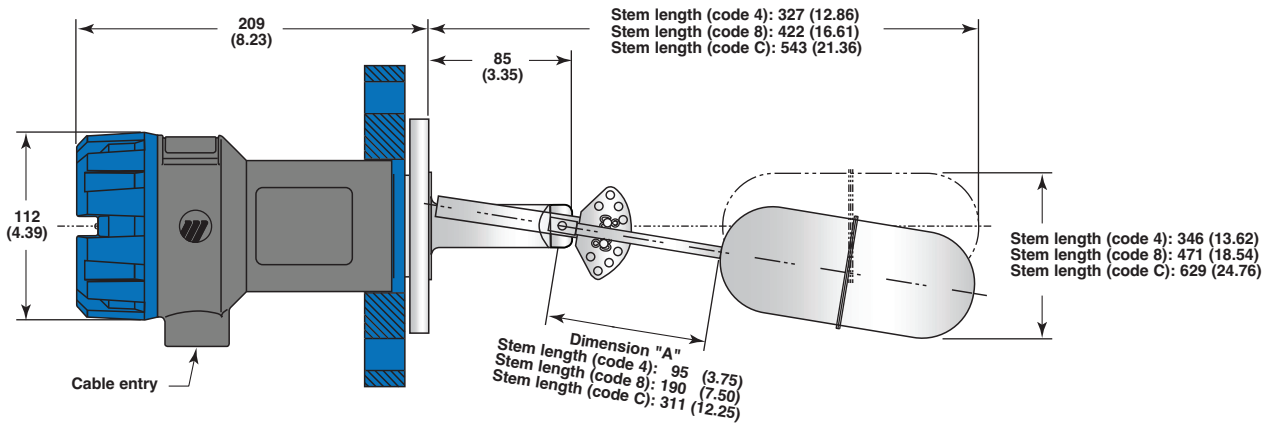


complete order code for flanged high pressure TUFFY®

X = product with a specific customer requirement

# T3C: ADJUSTABLE WIDE DIFFERENTIAL

DIMENSIONS in mm (inches)



Process connection: up to 300 lbs ASME / PN 40 flanges  
Level Differential: adjustable from 35 mm (1.36") to 464 mm (18.26")

## 1 - 3 | BASIC MODEL NUMBER

T	3	C	Adjustable diff. Tuffy with 316/316L (1.4401/1.4404) float - min. S.G. 0,78 / max 49,6 bar (720 psi)
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## 4 | STEM EXTENSION LENGTH - DIMENSION "A"

4	95 mm (3.75") stem extension
8	190 mm (7.50") stem extension
C	311 mm (12.25") stem extension

## 6 - 7 | PROCESS CONNECTION – ASME Flanges      PROCESS CONNECTION – EN Flanges

3	A	3"	150 lbs RF ASME Flange	A	1	DN 80, PN 16	EN 1092-1 Type B1
3	B	3"	300 lbs RF ASME Flange	A	2	DN 80, PN 25/40	EN 1092-1 Type B1
4	A	4"	150 lbs RF ASME Flange	B	1	DN 100, PN 16	EN 1092-1 Type B1
4	B	4"	300 lbs RF ASME Flange	B	2	DN 100, PN 25/40	EN 1092-1 Type B1
5	A	5"	150 lbs RF ASME Flange	C	1	DN 125, PN 16	EN 1092-1 Type B1
5	B	5"	300 lbs RF ASME Flange	C	2	DN 125, PN 25/40	EN 1092-1 Type B1
6	A	6"	150 lbs RF ASME Flange	D	1	DN 150, PN 16	EN 1092-1 Type B1
6	B	6"	300 lbs RF ASME Flange	D	2	DN 150, PN 25/40	EN 1092-1 Type B1

## 8 | DESIGN CODE AND FLANGE MATERIAL

Design codes				Flange material
Standard	ASME B31.3	NACE	ASME B31.3 & NACE	
1	2	–	–	Carbon steel
A	E	J	N	Carbon steel w. 316/316L cladding
B	F	K	P	316/316L stainless steel

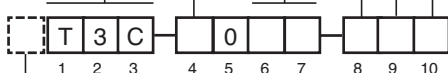
## 9 | SWITCH TYPE (see table on page 2 for full details)

0	SPDT with silver contacts
1	DPDT with silver contacts
2	SPDT with gold plated contacts
3	DPDT with gold plated contacts
4	Hermetically sealed, SPDT with silver contacts
6	Hermetically sealed, SPDT with gold plated contacts
7	High temperature, hermetically sealed, SPDT with silver contacts

## 10 | HOUSING MATERIALS AND CABLE ENTRY

Consult factory for proper partnumbers for FM/CSA approved units

1	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
2	Cast iron, single 3/4" NPT cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
3	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
4	Cast iron, single M20 x 1,5 cable entry, ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
M	Cast aluminium, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
N	Cast iron, single 3/4" NPT cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
P	Cast aluminium, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga
R	Cast iron, single M20 x 1,5 cable entry, ATEX II 1 G / IECEx Ex ia IIC T6 Ga



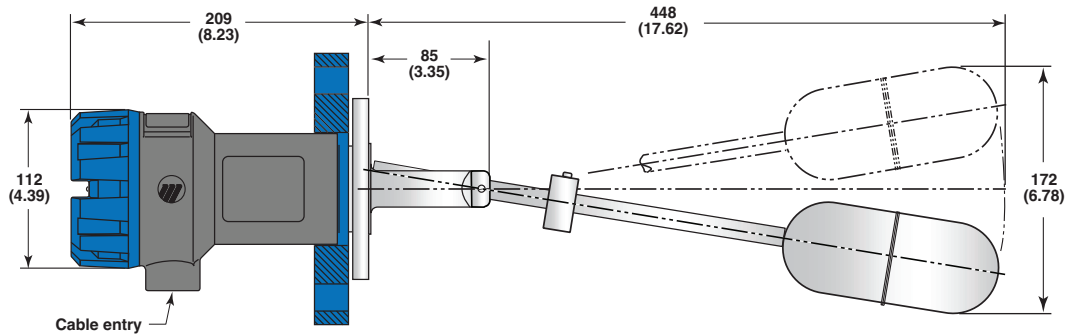
complete order code for adjustable differential TUFFY®

X = product with a specific customer requirement



# T3B: INTERFACE

DIMENSIONS in mm (inches)



Process connection: up to 300 lbs ASME / PN 40 flanges  
 Min S.G. of lower liquid: 0,81 kg/dm<sup>3</sup>  
 Min S.G. difference between both liquids: 0,1 kg/dm<sup>3</sup>  
 Level differential: 44 mm (1.72")

### 1 - 3 | BASIC MODEL NUMBER

T	3	B	Interface Tuffy with 316/316L (1.4401/1.4404) float - max 49,6 bar (720 psi)
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### 4 | SPECIFIC GRAVITY OF LOWER LIQUID (consult factory for S.G. higher than 1.0 kg/dm<sup>3</sup>)

0,81	0,82	0,83	0,84	0,85	0,86	0,87	0,88	0,89	0,90	Specific Gravity
A	B	C	D	E	F	G	H	J	K	Code
0,91	0,92	0,93	0,94	0,95	0,96	0,97	0,98	0,99	1,00	Specific Gravity
L	M	N	P	R	S	T	U	V	W	Code

### 6 - 7 | PROCESS CONNECTION – ASME Flanges

3	A	3"	150 lbs RF ASME Flange
3	B	3"	300 lbs RF ASME Flange
4	A	4"	150 lbs RF ASME Flange
4	B	4"	300 lbs RF ASME Flange
5	A	5"	150 lbs RF ASME Flange
5	B	5"	300 lbs RF ASME Flange
6	A	6"	150 lbs RF ASME Flange
6	B	6"	300 lbs RF ASME Flange

### PROCESS CONNECTION – EN Flanges

A	1	DN 80, PN 16	EN 1092-1 Type B1
A	2	DN 80, PN 25/40	EN 1092-1 Type B1
B	1	DN 100, PN 16	EN 1092-1 Type B1
B	2	DN 100, PN 25/40	EN 1092-1 Type B1
C	1	DN 125, PN 16	EN 1092-1 Type B1
C	2	DN 125, PN 25/40	EN 1092-1 Type B1
D	1	DN 150, PN 16	EN 1092-1 Type B1
D	2	DN 150, PN 25/40	EN 1092-1 Type B1

### 8 | DESIGN CODE AND FLANGE MATERIAL

Design codes				Flange material
Standard	ASME B31.3	NACE	ASME B31.3 & NACE	
1	2	–	–	Carbon steel
A	E	J	N	Carbon steel w. 316/316L cladding
B	F	K	P	316/316L stainless steel

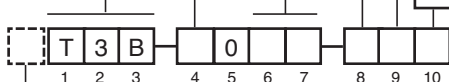
### 9 | SWITCH TYPE (see table on page 2 for full details)

0	SPDT with silver contacts
1	DPDT with silver contacts
2	SPDT with gold plated contacts
3	DPDT with gold plated contacts
4	Hermetically sealed, SPDT with silver contacts
6	Hermetically sealed, SPDT with gold plated contacts
7	High temperature, hermetically sealed, SPDT with silver contacts

### 10 | HOUSING MATERIALS AND CABLE ENTRY

Consult factory for proper partnumbers for FM/CSA approved units

1	Cast aluminium, single 3/4" NPT cable entry,	ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
2	Cast iron, single 3/4" NPT cable entry,	ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
3	Cast aluminium, single M20 x 1,5 cable entry,	ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
4	Cast iron, single M20 x 1,5 cable entry,	ATEX II 1/2 G / IECEx Ex db IIC T6 Ga/Gb
M	Cast aluminium, single 3/4" NPT cable entry,	ATEX II 1 G / IECEx Ex ia IIC T6 Ga
N	Cast iron, single 3/4" NPT cable entry,	ATEX II 1 G / IECEx Ex ia IIC T6 Ga
P	Cast aluminium, single M20 x 1,5 cable entry,	ATEX II 1 G / IECEx Ex ia IIC T6 Ga
R	Cast iron, single M20 x 1,5 cable entry,	ATEX II 1 G / IECEx Ex ia IIC T6 Ga



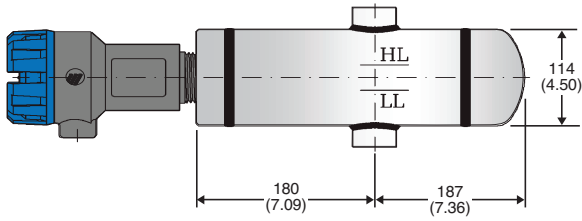
complete order code for interface TUFFY®

X = product with a specific customer requirement

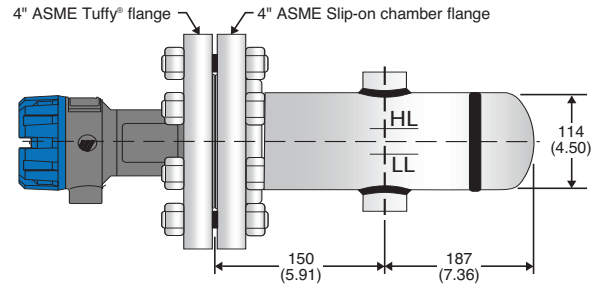
**EXTERNAL CAGES FOR NARROW DIFFERENTIAL TUFFY (T31, T35, 039-6000)**  
 DIMENSIONS in mm (inches)

**CAGE – STYLE**

**Sealed cage 033**

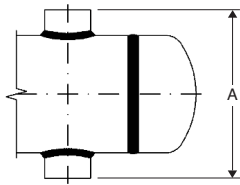


**Flanged cage 035**



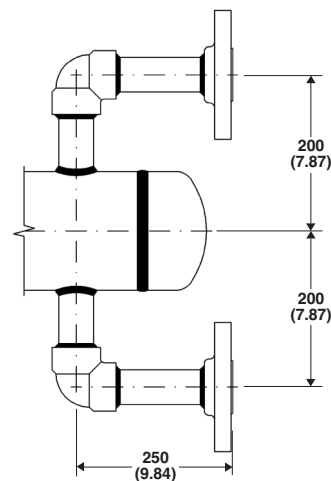
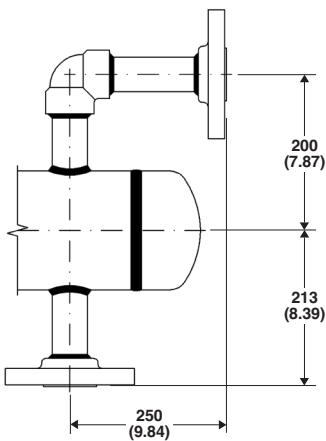
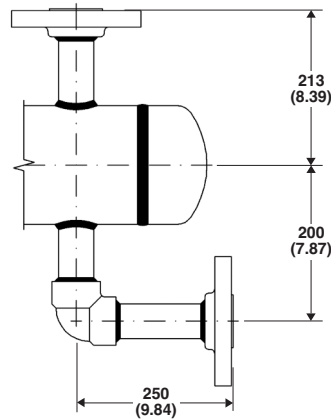
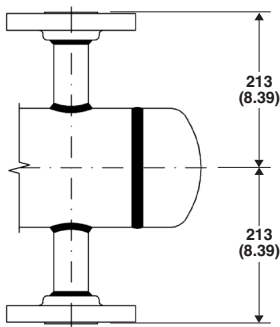
**CAGE – PROCESS CONNECTION**

**Threaded/Socket weld**



CONNECTION	DIMENSION A		
	1"	1 1/2"	2"
NPT-F & Socket weld	164 (6.46)	188 (7.40)	194 (7.64)

**Flanged**



**1 - 3 | BASIC MODEL NUMBER**

0	3	3	4" sealed cage (matches TUFFY® with 2" NPT-M process connection)
0	3	5	4" flanged cage (matches TUFFY® with 4" ASME flange process connection)

**4 | MATERIAL OF CONSTRUCTION**

4	Carbon steel
5	316/316L (1.4401/1.4404) stainless steel

**5 | PROCESS CONNECTION – TYPE + RATING**

**Threaded or socket weld**

A	Threaded NPT-F
B	Socket weld

**ASME flanges**

D	150 lbs RF	Slip-On
E	300 lbs RF	Slip-On
F	600 lbs RF	Slip-On
L	150 lbs RF	Weld Neck
M	300 lbs RF	Weld Neck
N	600 lbs RF	Weld Neck
P	600 lbs RJ	Weld Neck

**EN flanges**

3	PN 16	EN 1092-1 Type B1
5	PN 25/40	EN 1092-1 Type B1
6	PN 63	EN 1092-1 Type B2
8	PN 100	EN 1092-1 Type B2

**6 | PROCESS CONNECTION – SIZE**

**Threaded, socket weld or ASME flanges**

B	1"
C	1 1/2"
D	2"

**EN flanges**

2	DN 25
3	DN 40
5	DN 50

**7 - 10 | CAGE CONFIGURATION**

**Threaded or socket weld process connection**

	M-000	033-cage
	M-001	035-cage (matches 4" 150 lbs RF flanged Tuffly®)
	M-002	035-cage (matches 4" 300 lbs RF flanged Tuffly®)
	M-003	035-cage (matches 4" 600 lbs RF flanged Tuffly®)

**Flanged process connection ①**

N - 0 0 0	P - 0 0 0	R - 0 0 0	S - 0 0 0
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① If 035-cage then select flanged Tuffly® as per table below:

ASME / EN rating process flanges	Flanged Tuffly®
150 lbs / PN 16	4" 150 lbs RF
300 lbs / PN 25/40	4" 300 lbs RF
600 lbs / PN 63 / PN 100	4" 600 lbs RF



**complete order code for external cage**

X = product with a specific customer requirement



#### QUALITY ASSURANCE - ISO 9001

THE QUALITY ASSURANCE SYSTEM IN PLACE AT MAGNETROL GUARANTEES THE HIGHEST LEVEL OF QUALITY DURING THE DESIGN, THE CONSTRUCTION AND THE SERVICE OF CONTROLS. OUR QUALITY ASSURANCE SYSTEM IS APPROVED AND CERTIFIED TO **ISO 9001** AND OUR TOTAL COMPANY IS COMMITTED TO PROVIDING FULL CUSTOMER SATISFACTION BOTH IN QUALITY PRODUCTS AND QUALITY SERVICE.

#### PRODUCT WARRANTY

ALL MAGNETROL MECHANICAL LEVEL CONTROLS ARE WARRANTED FREE OF DEFECTS IN MATERIALS AND WORKMANSHIP FOR 3 FULL YEARS FROM THE DATE OF ORIGINAL FACTORY SHIPMENT.

IF RETURNED WITHIN THE WARRANTY PERIOD; AND, UPON FACTORY INSPECTION OF THE CONTROL, THE CAUSE OF THE CLAIM IS DETERMINED TO BE COVERED UNDER THE WARRANTY; THEN, MAGNETROL INTERNATIONAL WILL REPAIR OR REPLACE THE CONTROL AT NO COST TO THE PURCHASER (OR OWNER) OTHER THAN TRANSPORTATION.

MAGNETROL SHALL NOT BE LIABLE FOR MISAPPLICATION, LABOR CLAIMS, DIRECT OR CONSEQUENTIAL DAMAGE OR EXPENSE ARISING FROM THE INSTALLATION OR USE OF THE EQUIPMENT. THERE ARE NO OTHER WARRANTIES EXPRESSED OR IMPLIED, EXCEPT, SPECIAL WRITTEN WARRANTIES COVERING SOME MAGNETROL PRODUCTS.

UNDER RESERVE OF MODIFICATIONS

BULLETIN: BE 44-118.13  
EFFECTIVE: JULY 2021  
SUPERSEDES: April 2019

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