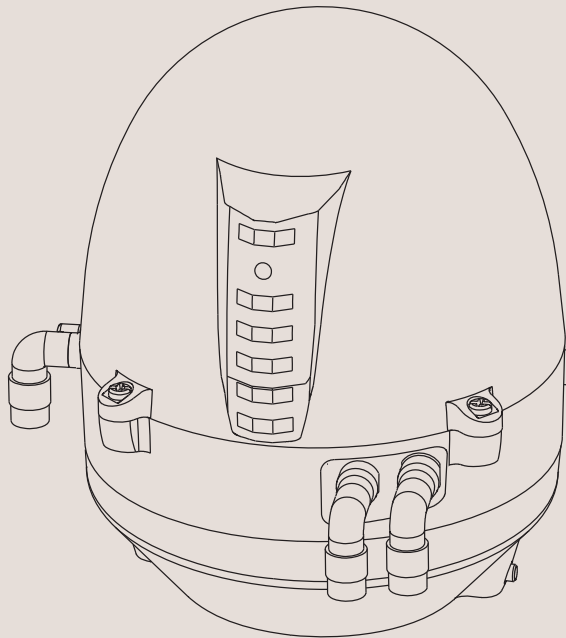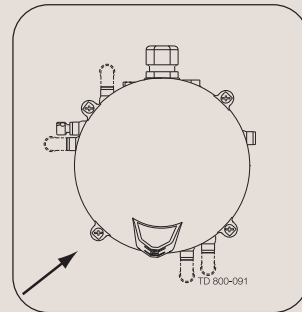# Instruction Manual

ThinkTop® DeviceNet ™ 11-25 VDC

TD800100_3

TD 800-091

The Top is identified by 4 fastening screws

The information herein is correct at the time of issue but may be subject to change without prior notice

1 EC Declaration of Conformity

The designating company

Alfa Laval
Company Name

Albuen 31, DK-6000 Kolding, Denmark
Address

+45 79 32 22 00
Phone No.

hereby declare that

Top Unit for Valve Control & Indication	ThinkTop®DeviceNet™	
Denomination	Type	Year

is in conformity with the following directives with amendments:
- Low Voltage Directive (LVD) 2006/95/EF
- EMC Directive 2004/108/EF
- ROHS Directive 2002/95/EEC

Manager, Product Centres, Compact Heat Exchangers & Fluid Handling	Bjarne Søndergaard
Title	Name

Alfa Laval Kolding	_B. Søndergaard_
Company	Signature

Designation

C ϵ

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

2.1   Important information

Always read the manual before using the top unit!

WARNING
Indicates that special procedures must be followed to avoid serious personal injury.

CAUTION
Indicates that special procedures must be followed to avoid damage to the ThinkTop.

NOTE
Indicates important information to simplify or clarify procedures.

2.2   Warning signs

General warning:

Dangerous electrical voltage:

Caustic agents:

2 Safety

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

2.3 Safety precautions

Installation

Always read the technical data thoroughly.

Never install the ThinkTop before valve or relay is in a safe position.

If welding close to the ThinkTop: **Always** earth close to the welding area.

Disconnect the ThinkTop.

Always have the ThinkTop electrically connected by authorized personnel.

Maintenance

Always read the technical data thoroughly.

Always fit the seals between valve and ThinkTop correctly.

Never service the ThinkTop before valve or relay is in a safe position.

Never service the ThinkTop with valve/actuator under pressure.

Never clean the ThinkTop with high pressure cleaning equipment.

Never use cleaning agents when cleaning the ThinkTop. Check with cleaning agent supplier.

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

3.1   DeviceNet^{TM} in generel

DeviceNet^{TM} is a low-cost communication link to connect industrial devices (such as limit switches, photoelectrical sensors, valve manifolds, motor starters, process sensors, bar cod readers, variable frequency drives, panel display and operator interfaces) to a network and eliminate expensive handwiring. The direct connectivity provides improved communication between devices as well as important device-level diagnostics not easily accessible or available through hardwires I/O interfaces. DeviceNet^{TM} is a simple networking solution that reduces costs as well as time to wire and install industrial automation devices, while providing interchangeabillity of similar components from multiple vendors.

DeviceNet^{TM} is an open network standard.

DeviceNet^{TM} features and functionality

Network size	Up to 63 nodes		
Network length	Selectable end-to-end network distance varies with speed		
	Baud Rate	Distance	
	125 Kbps	500 (1,640 ft)	
	250 Kbps	250 (820 ft)	
	500 Kbps	100 (328 ft)	
Data Packets	0-8 bytes		
Bus Topology	Linear (trunk line/drop line); power and signal on the same network cable		
Bus Addressing	Peer-to-Peer with Multi-Cast (one-to-many); Multi-Master and Master/Slave special case; polled or change-of-state (exception-based)		
System Features	Removal and replacement of devices from the network under power		

The basic trunk line/drop line topology provides separate twisted pair busses for both signal and power distribution. Thick or thin cable can be used for either trunk lines or drop lines. End-to-end network distance varies with data rate and cable size.

Data Rates	125 Kbps	250 Kbps	500 Kbps
Thick Trunk Length	500 m (1,640 ft)	250 m (820 ft)	100 m (328 ft)
Thick Trunk Length	100 m (328 ft)	100 m (328 ft)	100 m (328 ft)
Maximum Drop Length	6 m (20 ft)	6 m (20 ft)	6 m (20 ft)
Cumulative Drop Length	156 m (512 ft)	78 m (256 ft)	39 m (128 ft)

The end-to-end network distance varies with data rate and cable thickness.

DeviceNet^{TM} requires a terminating resistor to be installed at each end of the trunk:

- 121 Ohm
- 1% metal film
- 1/4 Watt

Terminating resistors should not be installed at the end of a drop line, only at the two ends of the trunk line.

For further information please see the DeviceNet^{TM} Standard.

3 General information

Unsafe practices and other important information are emphasized in this manual.
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Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

DeviceNet™ Features

Device Type	Generic		Master/scanner	N
Explicit peer to peer messaging	N		I/O Slave messaging	
I/O peer to peer messaging	N		• Bit strobe	N
Configuration consistency value	N		• Polling	Y
Faulted node recovery	N		• Cyclic	N
Baud rates	125K, 250K, 500K		125K, 250K, 500K	Y
Configuration method	EDS			

The end-to-end network distance varies with data rate and cable thickness.

Special DeviceNet™ functions
Class 100 Attributes

- • Setup commands
- • Configurator
- • Alarm setup
- • Time Total
- • Time Closed
- • Time Open

- • Time to maintenance
- • Last stroke travel time
- • Last stroke travel length (mm)
- • Current position [mm] (0 - 80 mm)
- • Activation's solenoid no. 1
- • Activation's solenoid no. 2
- • Activation's solenoid no. 3

- • Open count
- • Closed count
- • Time of last maintenance

See also section 3.1.4 ThinkTop DeviceNet™Attribute List

DeviceNet™ interface
Baud rates: 125k, 250K and 500k.
Polling and change of state (COS) I/O slave messaging.

Poll: 7 or 2 bytes (optional).
2 bytes = Input/outputs and alarms (class 4).
7 bytes = Input/outputs alarms and class 100/attributes.
7 bytes is standard.
Changing from 7 bytes to 2 bytes: remove jumper (#12 and #13). A power recycle is necessary when changing
byte sizes.

COS: 2 bytes, 7 bytes is not supported.

Node address
Range: 0 – 63.
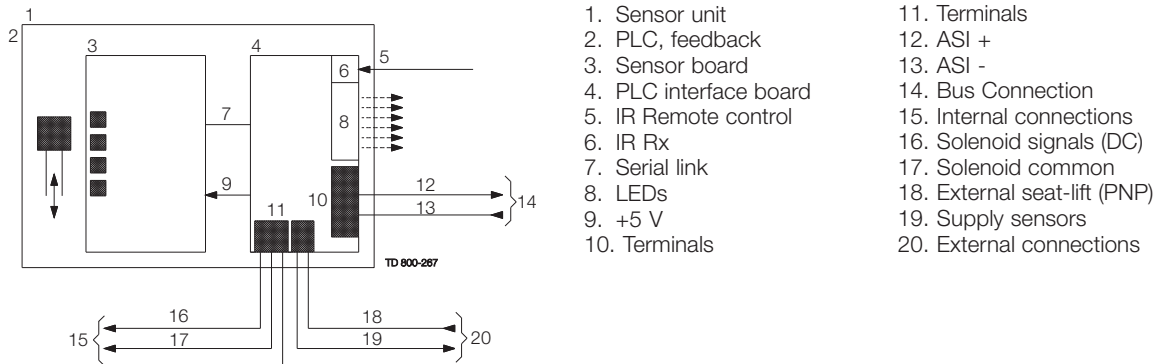Default slave address: 63.

Power Supply
The power supply to the complete unit is taken from the DeviceNet.
Supply voltage: 11 – 25 V DC, as specified for the DeviceNet.
Supply current: Max. 45 mA (for sensor unit alone)
                          (excluding current to the solenoids and the external proximity switches).
Electrical connection: Direct cable gland entry (hard wired).
                          PG11 (ø4 - ø10 mm).
                          PG7 (ø3 - ø6.5 mm) option, external sensor.

Unsafe practices and other important information are emphasized in this manual.
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4.1 ThinkTop ® DeviceNet ™ features

"No Touch" sensor system

TD 800-267

1. Sensor unit
2. PLC, feedback
3. Sensor board
4. PLC interface board
5. IR Remote control
6. IR Rx
7. Serial link
8. LEDs
9. +5 V
10. Terminals
11. Terminals
12. ASI +
13. ASI -
14. Bus Connection
15. Internal connections
16. Solenoid signals (DC)
17. Solenoid common
18. External seat-lift (PNP)
19. Supply sensors
20. External connections

Type: Alfa Laval "No Touch" System. For wire connections: See 5.4 Electrical connection, internal".

Features
- Tolerance programmes.
- Self adjustment programme (SRC/ARC valves only).
- Built-in maintenance monitor.
- Setup by internal push buttons or remote control (IR Keypad).
- Setup and local fault supervision.
- Setup saved at power shutdown.
- Visual LED Indicator lights.

Sensor System
Unique "No Touch" sensor system without any mechanical sensor adjustments. A magnet (indication pin) is mounted on the valve stem and the magnetic field (axial) is detected by sensor chips inside the sensor board. The measuring angle from each chip is used to locate the current position of the valve stem with an accuracy of ± 0.1mm. Note that the distance to the indication pin can be 5 mm ± 3 mm.

Feedback signals
Input signals (produced by the sensor unit) transmitted over the DeviceNet™ - class 4.
Five feedback signals: Closed valve, open valve, seatlift 1, seatlift 2 and status.
The status signal is used for five purposes:
• To indicate that a setup is in progress (LED D).
• To indicate an error condition (LED D), (flashing = software error), (steady = hardware error).
• To indicate that maintenance is required (LED F).
• To indicate if there is a conflict in the self adjustment programme (LED F).
• To indicate if no communication exists between ThinkTop® and PLC (LED D, steady).

Tolerance programme
Individual programme according to valve types.

Type 0: ....Bypass valve type / keep present valve type.
Type 1: ....SRC/ARC and Series 700 valves, only when self adjustment is enabled - Not recommended.
Type 2: ....LKB (LKLA-T).
Type 3: ....Unique Mixproof, SMP-SC Spillage-Free, and SRC-PV.
Type 4: ....SMP-SC, SMP-TO, SMP-BC, SMP-BCA, SBV, SRC, ARC, Unique SSV,
                               Unique SSV Aseptic, Unique-TO and Series 700 valves.
Type 5: ....All Parameters Set To Default (also valid for MH valve and SMP-EC
                               (seat-lift indication not possible for SMP-EC)).

Preset and reset values: Tolerance programme No./Type 5 (± 5mm) and all functions are disabled.

Note! Important to select the right tolerance programme in order to ensure optimum controlled closeness of valves.

4 Technical specifications

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Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
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Self Adjustment (SRC/ARC valves only)
The self adjustment feature is an exceptional aspect of the ThinkTop design. A programme can be activated to allow an adjustment of the tolerance band if the seals in the valve are being compressed or are worn. When the tolerance band of the unit has been adjusted 0.3 mm, an alert warning will appear in the form of a status signal and a flashing maintenance LED. After 0.5 mm adjustment an alarm warning appears: Loss of feedback signal, status signal and steady maintenance light indicating a replacement of the seal.

Built-in Maintenance Monitor
The unit can be preset to indicate when the time for maintenance of the valve has been reached. A status signal and flashing maintenance LED can be programmed to return after 3, 6, 9 or 12 months or more.

Technical specifications
Sensor system

Sensor accuracy: ....± 0.1 mm.
Distance to indication pin: ....5 ± 3 mm.
Stroke length: ....0.1 - 80 mm.

Electrical connection:
Direct main cable gland entry (hard wired) PG11 (ø4 - ø10 mm).

Direct external/sensor cable gland entry PG7 (ø3 - ø6.5 mm) option, external sensor.

Terminals
The terminal row of the sensor unit is equipped with screw terminals for both internal as well as external cables and wires. The terminals are suitable for wires up to 0.75 mm^2 (AWG 19).

External sensors
The external sensors are used for seat-lift supervision when seat-lift can not be internally detected. The sensors get their supply voltage from the terminal row. The output signals from the sensors are connected to two inputs on the terminal row on the internal sensor unit. If the actual setup is set for internal seat-lift, the corresponding external signal is not used, otherwise the external signal logically controls the corresponding feedback to the PLC (Programmable Logic Controller).
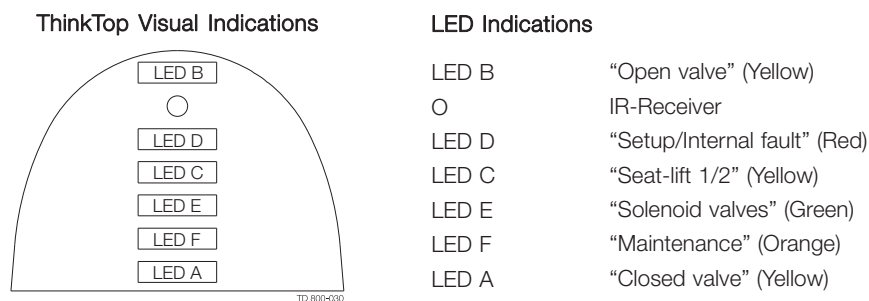**Note!** If using external sensor, the sensor must be active/activated when performing a setup routine of the control head.

Supply voltage: ....As specified for the AS-Interface (typical 30VDC)
Supply current: ....Max. 15 mA per sensor.
Type of sensor: ....VDC, only 3-wire sensor, PNP.
Cable length: ....Max. 3 m.

Alarm mask
Output signals received from the DeviceNetTM (consumed by the sensor unit).
Four-bit mask to disable the alarm functions for the states "closed", "open", "seatlift 1" and "seatlift 2" respectively.

See also section 3.1.4 "ThinkTop® DeviceNetTM Attribute List".

ThinkTop Visual Indications

TD 800-030

LED Indications

LED B	"Open valve" (Yellow)
O	IR-Receiver
LED D	"Setup/Internal fault" (Red)
LED C	"Seat-lift 1/2" (Yellow)
LED E	"Solenoid valves" (Green)
LED F	"Maintenance" (Orange)
LED A	"Closed valve" (Yellow)

Unsafe practices and other important information are emphasized in this manual.
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Note: If the programmer wishes to detect a physical closed valve position in an "Open Valve" sensor position, then there is no longer any consistence between the sensor valve detection position and the visual indications of the ThinkTop.

Technical specifications solenoid valves
Solenoid signals

Output signals received from the DeviceNet $_{TM}$ (consumed by the sensor unit) - class 4.

Three bits to control the solenoid drives located in the sensor unit.

Internal connections (solenoids)

The solenoid drivers are reducing the solenoid power by PWM after activation. The number of solenoids actually mounted in the control head could be 0 - 3.

Technical specifications	
Up to 3 solenoid valves in each unit.	
Type	3/2 or 5/2 valve (only possible with one 5/2 valve).
Air supply	300-900 kPa (3-9 bar).
Filtered air, max. particles or dirt	5 μ 5-5 mg/m^3.
Max. flow	180 l/min.
Max. oil content	1 mg/m^3.
Max. water content	0.88 g/m^3 -20 ^{o}C compressed air.
Throughput	ø2.5 mm.
Air restriction (throttle function) air inlet/outlet.	Yes.
Manual hold override.	Yes.
External air tube connection	ø6 mm or 1/4" (specify when ordering).
Silencer/filter	Connection possible via ø6 mm or 1/4". (Filter recommended in tropical regions).
Solenoids drive	
Solenoid valve	8 VDC.
O/P Valtage	8 VDC +/- 5%
Power consumption	0.75W Max.
Current consumption (per solenoid)	30mA Max.
PWM Pull-in pulse length150ms Max.	150ms Max.
PWM duty cycle	40% +/- 10%
PWM frequency	2 kHz +/- 10%
PWM = Pulse width modulated	
*) **Note!** Filter recommended in tropical regions.	

Technical specifications aux. outputs
Three aux. outputs can be used for external devices. The drivers are always NPN outputs and PWM mode is not possible. The number of aux. outputs for activation of external devices can be 0-3. Clarification: All 3 outputs can be activated at the same time but if solenoid 1 is in use, aux. 1 can not be used! If solenoid 1 and 2 are in use, aux. 1 and 2 can not be used! If solenoid 1, 2 and 3 are in use, no aux. can be used! A mix of solenoid and aux. outputs is possible.

Output: NPN (sinking).

Output voltage: 24 VDC ± 15%. Network power connection! User must ensure 24 VDC on the network (at the top) when these outputs are used.
Load current: Max 75 mA.
As these outputs drive constant current, using several nodes in this mode will reduce the number of nodes supported by a typical 8A network supply. The user must ensure that total network current consumption is less than the supply rating.

ThinkTop®, EDS file
Please see web address www.odva.org for further information and for downloading the EDS file or contact your Alfa Laval company.

4 Technical specifications

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
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ThinkTop DeviceNet ™ attribute list

Name	Path					R/W/CS	Raw data		
				Attributes			data type	len.	LSB
Release DNET 4.6	Class	Inst	dec.	hex.	"poll"				
Valve value	4	1	3	-	-	R	Byte	1	-
Valve command	4	3	3	-	-	R/W	Byte	1	-
Alarm status	4	4	3	-	-	R	Byte	2	-
Alarm mask	4	5	3	-	-	R/W	Byte	2	-
Extended status #1	100	1	101	65	01	R	Byte	3	-
Extended Status #2	100	1	102	66	02	R	Byte	3	-
Setup command	100	1	110	6E	0A	R/W	Byte	1	-
Configuration	100	1	111	6F	0B	R	Byte	2	-
Alarm #1 Setup	100	1	121	79	15	R/W	Byte	2	0.524 sec.
Alarm #2 Setup	100	1	122	7A	16	R/W	Byte	2	0.524 sec.
Alarm #3 Setup	100	1	123	7B	17	R/W	Byte	2	0.524 sec.
Alarm #4 Setup	100	1	124	7C	18	R/W	Byte	2	0.524 sec.
Alarm #5 Setup	100	1	125	7D	19	R/W	Byte	2	0.524 sec.
Alarm #6 Setup	100	1	126	7E	1A	R/W	Byte	2	0.524 sec.
Current position	100	1	130	82	1E	R	UINT	2	0.01982 m
Time TOTAL	100	1	131	83	1F	R	UINT	2	2.38 hrs.
Time CLOSED	100	1	132	84	20	R	UINT	2	2.38 hrs.
Time OPEN	100	1	133	85	21	R	UINT	2	2.38 hrs.
Time to Maint.	100	1	134	86	22	R	UINT	2	2.38 hrs.
Last stroke Time	100	1	135	87	23	R	UINT	2	0.131 sec.
Last Stroke Length	100	1	136	88	24	R	UINT	2	0.01982 mm
Coil Count #1	100	1	137	89	25	R	ULINT	4	counts
Coil Count #2	100	1	138	8A	26	R	ULINT	4	counts
Coil Count #3	100	1	139	8B	27	R	ULINT	4	sounts
OPEN Count	100	1	140	8C	28	R	ULINT	4	counts
CLOSED Count	100	1	141	8D	29	R	ULINT	4	counts
Time of Last Maint.	100	1	142	8E	2A	R	UINT	2	2.38 hrs.

Unsafe practices and other important information are emphasized in this manual.
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ThinkTop® DeviceNet™ attribute list

Name	Eng. Units Conv.			Bit maps/data			
	mult.	divisor	units	byte 1	byte 2	byte 3	byte 4
Release DNET 4.6							
Valve value	-	-	-	PLC_image	-	-	-
Valve command	-	-	-	Solenoids 1,2&3	-	-	-
Alarm status	-	-	-	Alarm_Status	Travelstatus	-	-
Alarm mask	-	-	-	Alarm_Mask	Travel Mask	-	-
Extended status #1	-	-	-	Error_Byte	PLC_Image	LED_Image	-
Extended Status #2	-	-	-	Alarm_Status	Travel_Status	Adjust_Status	-
Setup command	-	-	-	ASI_Data(4...7)	-	-	-
Configuration	-	-	-	M_Config	D-Config	-	-
Alarm #1 Setup	-	-	-	End condition	Time	-	-
Alarm #2 Setup	-	-	-	End condition	Time	-	-
Alarm #3 Setup	-	-	-	End condition	Time	-	-
Alarm #4 Setup	-	-	-	End condition	Time	-	-
Alarm #5 Setup	-	-	-	End condition	Time	-	-
Alarm #6 Setup	-	-	-	End condition	Time	-	-
Current position	991	50,000	mm	LSB	MSB	-	-
Time TOTAL	992	10,000	days	LSB	MSB	-	-
Time CLOSED	992	10,000	days	LSB	MSB	-	-
Time OPEN	992	10,000	days	LSB	MSB	-	-
Time to Maint.	992	10,000	days	LSB	MSB	-	-
Last stroke Time	131	10.000	sec.	LSB	MSB	-	-
Last Stroke Length	991	50,000	mm	LSB	MSB	-	-
Coil Count #1	-	-	-	LSB	mid byte	MSB	0
Coil Count #2	-	-	-	LSB	mid byte	MSB	0
Coil Count #3	-	-	-	LSB	mid byte	MSB	0
OPEN Count	-	-	-	LSB	mid byte	MSB	0
CLOSED Count	-	-	-	LSB	mid byte	MSB	0
Time of Last Maint.	992	10,000	days	LSB	MSB	-	-

4 Technical specifications

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

ThinkTop® DeviceNet™ bit mappings

PLC_Image (feedbacks)	Travel in progress	Alarm timer expired	x	Maint.	SL2	SL1	OPEN	CLOSED
LED_Image	x	x	CLOSED	Maint.	Coil	Seat Lift	Setup	OPEN
Error_Byte	Multiple coil request	Timeout on last command	Button II failure	Button I failure	Tx/Rx failure	Bus Offline	Position Over Range	Check Sum Error
Solenoid 1,2 &3	x	x	x	x	Coil #3	Coil #2	Coil #1	x
Adjust_Status	x	x	CLOSED x	CLOSED x	OPEN Alarm	Alert	Alarm	x
Travel_Status	Travel in Progress	x	x	x	x	x	x	x
Timeout Alarm_Status	Timer Running	On last command	Alarm #6 active	Alarm #5 active	Alarm #4 active	Alarm #3 active	Alarm #2 active	Alarm #2 active
Alarm Setup (1..6) End condition:	Steady	x	x	x	SL2	SL1	OPEn	CLOSED
Time: LSB=0.524 sec.	~ 67,1 s	~ 33,5 s	~ 16,8 s	~ 8,4 s	~ 4,2 s	~ 2,1 s	~ 1,0 s	~ 0,5 s
Alarm Mask	x	x	Coil #3 de-energize enabled	Coil #2 de-energize enabled	Coil #1 de-energize enabled	Coil #3 energize enabled	Coil #2 energize enabled	Coil #1 energize enabled
Travel Mask	x	x	Coil #3 de-energize disabled	Coil #3 de-energize disabled	Coil #3 de-energize disabledis	Coil #3 energize disabled	Coil #3 energize disabled	Coil #3 energize disabled

Unsafe practices and other important information are emphasized in this manual.
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Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

ThinkTop DeviceNet Poll and COS command structures

Poll Request Message format

byte				bit				
	7	6	5	4	3	2	1	0
0	x	x	x	x	Coil #3 de-energize	Coil #2 de-energize	Coil #1 de-energize	x
1	x	x	Alarm #6 enable coil #3 enrgize	Alarm #5 enable coil #2 enrgize	Alarm #4 enable coil #1 enrgize	Alarm #3 enable coil #3 enrgize	Alarm #2 enable coil #2 enrgize	Alarm #1 enable coil #1 enrgize
2	Write Attrib. Flag	Requested index for Class #100 attribute. Note: The index is 0-relative based on attribute ID #100						
3	Attribute Data Byte 0 - LSB							
4	Attribute Data Byte 1							
5	Attribute Data Byte 2							
6	Attribute Data Byte 3 - MSB							

Poll Response Message Format

byte	bit							
	7	6	5	4	3	2	1	0
0	Travel in Progress	Timer Expired	x	MAINT. ERROR	Seat #2 Status	Seat #1 Status	OPEN Status	CLOSED Status
1	Timer Running	Timer Expired	Alarm #6 active	Alarm #5 active	Alarm #4 active	Alarm #3 active	Alarm #2 active	Alarm #1 active
2	Valid Data Flag	Requested index for Class #100 attribute. Note: The index is 0-relative based on attribute ID #100						
3	Attribute Data Byte 0 - LSB							
4	Attribute Data Byte 1							
5	Attribute Data Byte 2							
6	Attribute Data Byte 3 - MSB							

Note! The 2 bytes Poll command structure is the same as the 7 bytes command with only bytes 0,1 used.

4 Technical specifications

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

COS command structure

COS Request Message

By definition the COS and Poll Request Messages are identical. For a device configured for a 7 bytes Poll, the corresponding COS request will be:

byte	bit							
	7	6	5	4	3	2	1	0
0	x	x	x	x	Coil #3 energize	Coil #2 energize	Coil #1 energize	x
1	x	x	Alarm #6 enable coil #3 de-energize	Alarm #5 enable coil #2 de-energize	Alarm #4 enable coil #1 de-energize	Alarm #3 enable coil #3 energize	Alarm #2 enable coil #2 energize	Alarm #1 enable coil #1 enrergize
2	Write Attrib. Flag	Requested index for Class #100 attribute. Note: The index is 0-relative based on attribute ID #100						
3	Attribute Data Byte 0 - LSB							
4	Attribute Data Byte 1							
5	Attribute Data Byte 2							
6	Attribute Data Byte 3 - MSB							

For a device configured for a 2 bytes Poll, the corresponding COS request will be.

byte	bit							
	7	6	5	4	3	2	1	0
0	x	x	x	x	Coil #3 energize	Coil #2 energize	Coil #1 energize	x
1	x	x	Alarm #6 enable coil #3 de-energize	Alarm #65 enable coil #2 de-energize	Alarm #4 enable coil #1 de-energize	Alarm #3 enable coil #3 energize	Alarm #2 enable coil #2 energize	Alarm #1 enable coil #1 energize

COS Response Message:
Only a 2 bytes message is supported and corresponds to the 2 byes Poll response message format.

byte	bit							
	7	6	5	4	3	2	1	0
0	Travel in Progress	Timer Expired	x	MAINT. ERROR	Seat #2 Status	Seat #1 Status	OPEN Status	CLOSED Status
1	Timer Running	Timer Expired	Alarm #6 active	Alarm #5 active	Alarm #4 active	Alarm #3 active	Alarm #2 active	Alarm #1 active

Note! A 7 bytes COS response message is not supported.

COS Trigger
The COS message is triggered by any change in the Valve Value (feedbacks) corresponding to byte-0 of the COS response message.

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

Typical power consumption

Test conditions: One ThinkTop DeviceNet^{TM} 11-25 VDC connected ti the network with 1 input (on) and:

No solenoids on	supply voltage 25 VDC	20 mA
1 solenoid active (PWM)	supply voltage 25 VDC	28 mA
2 solenoid active (PWM)	supply voltage 25 VDC	36 mA
3 solenoid active (PWM)	supply voltage 25 VDC	44mA
No solenoids on	supply voltage 11 VDC	34 mA
1 solenoid active (PWM)	supply voltage 11 VDC	58 mA
2 solenoid active (PWM)	supply voltage 11 VDC	82 mA
3 solenoid active (PWM)	supply voltage 11 VDC	106 mA

Note: If the Aux. Outputs are used instead of the solenoids for activation of external devicces, the consumption is depending on the load current (see "Aux. Outputs").

Materials

Plastic parts	Nylon PA12
Steel parts	Stainless steel AISI 304 and 316
Seals	FPM (air fittings), EPDM rubber for SMP-EC stem
Gore Vent. membrane	PBT palstic

Micro environment demand specifications

Temperature		
Working:	-20°C to +85°C	IEC 68-2-1/2
Storage:	-40°C to +85°C	IEC 68-2-1/2
Temperature change:	-25°C to +70°C	IEC 68-2-14
Vibration	10-55 Hz, 0.7 mm	IEC 68-2-6
	55-500 Hz, 10g	
	3 x 30 min, 1 octave/min	
Drop test		IEC 68-2-32
Humidity		
Constant humidity:	+40°C, 21 days, 93% R.H.	IEC 68-2-3
Cyclic humidity:	+25°C/+55°C	
	12 cycles	IEC 68-2-30
(working)	93% R.H.	
Protection class	IP66 and IP67	IEC 529
Input treshold		
Voltage/current:	Type 1 input requirements	EN 61131-2
EMC Directive	2004/108/EF	EN 61000-6-3, EN 61000-6-2
AS-Interface	Version 2.1*)	EN50295
	Version 3.0 **)	
UL Approval	8-30 VAC/VDC, Class 2 input,	
	45 mA max. output	UL 508-E203255

*) Max. 31 ThinkTop units on a single master/gateway. **) Max. 62 ThinkTop units on a single master/gateway.

5   Installation

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

5.1   Installation on air actuators

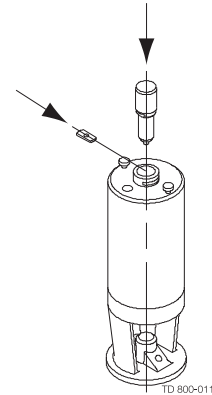**Step 1**

⚠️

**Always** read the technical data thoroughly.

⚠️

Always have the ThinkTop electrically connected by authorized
personnel.

Step 2
1. Fit the air fittings on actuator if not mounted.
2. Fit the activator stem (magnet) and tighten **carefully**
   with a spanner.

SRC/ARC only

TD 800-011

Step 3
1. Place the ThinkTop on top of the actuator.
2. Make sure X-ring is mounted.

TD 800-485
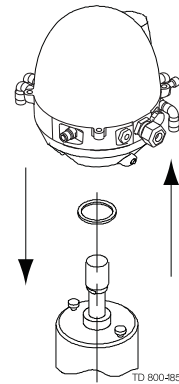
Step 4
1. Ensure that the unit is correctly mounted by **pressing** down
   on top of the ThinkTop.
2. Tighten the two Allen screws **carefully** (1.50 Nm).
3. Turn the actuator to have LEDs in a front view.
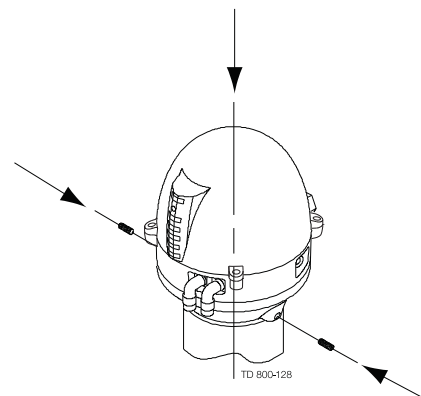
TD 800-128

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

Step 5
Fit the ø6 mm (1/4") air tubes to ThinkTop.
(see drawing "Air connections" page 22).

TD 800-129
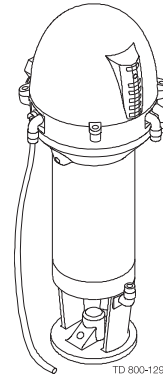
Step 6
Fit the air tubes to the actuator
(see drawing "Air connections" page 22).

TD 800-131
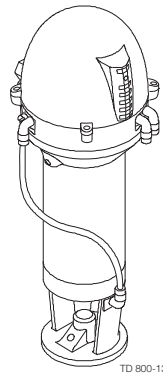
Step 7
Untighten the four screws and pull off cover of ThinkTop.

TD 800-247
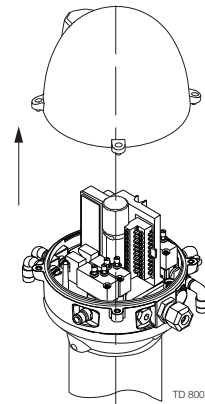
Step 8
1. Install cable (if not present) through the cable gland.
2. Connect the ThinkTop electrically
   (see page 5.4 Electrical connection, internal).
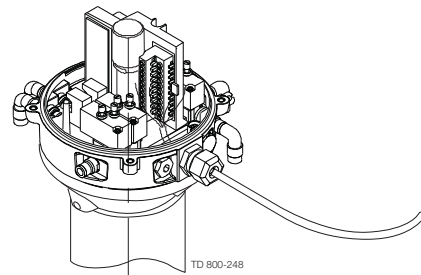
TD 800-248

5 Installation

Step 9
Make sure the cable gland is completely tightened.

TD 800-249
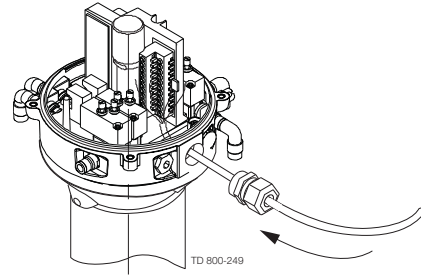
Step 10
Set up the ThinkTop (see chapter 6 Setup diagram).

NOTE!
The unit can be set up with the cover installed by using the IR keypad. To energize the valve, use a separate air tube or be in radio contact with the control room.

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

5.2   Installation on Series 700 valves

Step 1

1. Remove the cover by loosening the four cover screws.
2. Separate the adapter from the base by loosening the three recess screws on top of the base.

Installation on air actuators:

TD 800-250
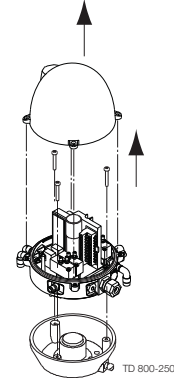
Step 2

1. Fit air fittings on actuator.
2. Position packing retainer in recess on actuator top.
3. Fit counter nut and indication pin (magnet) on actuator rod. Engage approx. ¼" thread. Tighten counter nut and indicator with two wrenches.


TD 800-048

Step 3

1. Place the two O-rings in the grooves in the bottom of the adapter. Then place the adapter on the actuator top. The small O-ring must be positioned over the air hole on the actuator.
2. Fasten the adapter with the four 5/16" Allen screws.


TD 800-049
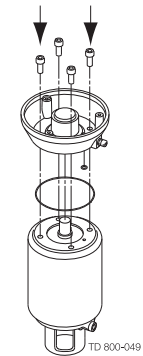
Step 4

Mount the base on the adapter in the position needed (can be rotated 120° in both directions). Note that one of the screw towers on the adapter has a guide recess (see * on drawing).

TD 800-251
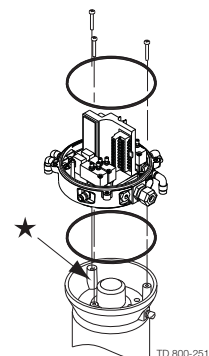
5 Installation

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

5.3 Air connections

TD 800-252
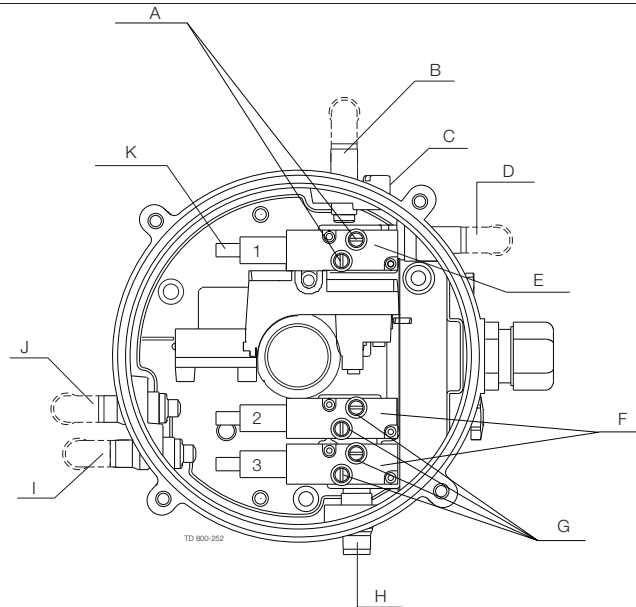
A. Air restriction (throttle function) air inlet/outlet
B. Air out 1A
C. Air exhaust
D. Air out 1B (5/2 port solenoid valve only)
E. Solenoid 3/2 or 5/2
F. 3/2 Solenoid valves only
G. Air restriction (throttle function) air inlet/outlet
H. Air in
I. Air out 3
J. Air out 2
K. Manual hold override

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

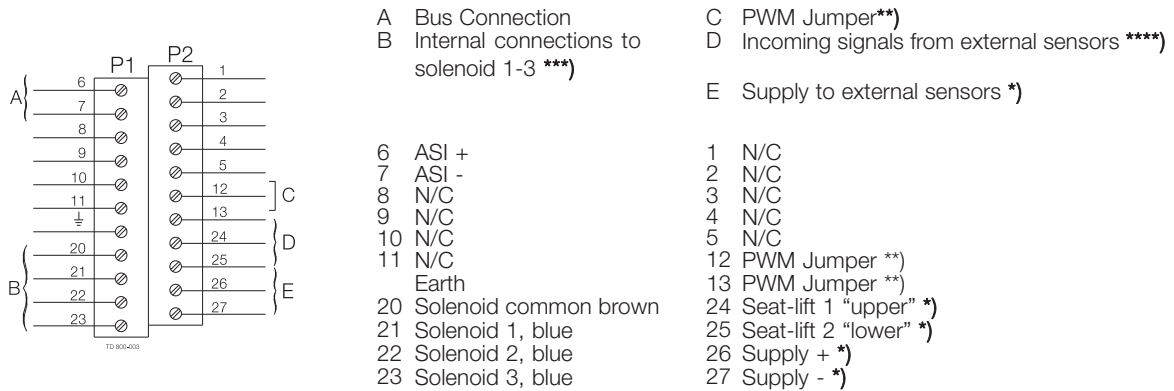## 5.4   Electrical connection, internal

A   Bus Connection
B   Internal connections to solenoid 1-3 *****)**

C   PWM Jumper****)**
D   Incoming signals from external sensors ******)**

E   Supply to external sensors ***)**

6	ASI +	
7	ASI -	
8	N/C	
9	N/C	
10	N/C	
11	N/C	
	Earth	
20	Solenoid common brown	
21	Solenoid 1, blue	
22	Solenoid 2, blue	
23	Solenoid 3, blue	

1	N/C
2	N/C
3	N/C
4	N/C
5	N/C
12	PWM Jumper **)
13	PWM Jumper **)
24	Seat-lift 1 "upper" *)
25	Seat-lift 2 "lower" *)
26	Supply + *)
27	Supply - *)

Table 1. Note!

*)   Terminals 24, 25, 26 and 27 can be used for external seat lift sensors as well as for any digital input. Always use an external PNP sensor. Two external signals can be connected, they are associated with feedback signal 3 (seat lift 1) and 4 (seat lift 2). External sensor must always be a 8-30 VDC PNP 3 wire sensor. Connect (-) common on terminal 27, and (+) common on terminal 26. The signals from the external sensors are associated as follows: sensor signal on terminal 24 (seat lift 1) associated with feedback 3 (seat lift 1), and sensor signal on terminal 25 (seat lift 2) associated with feedback 4 (seat lift 2).

**)   Jumper present = PWM. See section 3.1.3 "Technical specifications solenoid valves".

***)   Internal connections: Terminals for connection for the solenoids mounted internally in the control head. The number of solenoids actually mounted in the control head could be 0 - 3. The signals are taken directly from the terminal row.

****) If using external sensor, the sensor must be active/activated when performing a set-up routine of the control head.

6 Setup diagram

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

6.1 ThinkTop setup utilising IR keypad

General

Flashing LED means no value set. Steady LED means value set as shown

Default: Step 2, Factory set tolerance band +/- 5mm
Step 3-8, disabled

D LED: Active during set-up: Flashing in step 1
Steady in all other steps

Or during operations, error condition: Steady showing hardware fault, indication pin out of range
Flashing showing software fault

Timeout: A 60 sec. timeout is started as soon as any button(s) are released
On timeout the setup is exited with no changes saved

IR Keypad: Remote distance 0-300 mm to ThinkTop

Symbols

X Push key on IR keypad with the same number

Simple representation of LED indication:

Yellow	B	
IR-Reciver	○	
Red	D	Steady LED
Yellow	C	
Green	E	
Orange	F	
Yellow	A	Flashing LED

General commands in each step (except step 1):

0   Next step / skip step   (In step 3-6 the program automatically moves to the next step when a position is stored)

5   Clear / disable step   (In step 2 this resets the unit and set the step 2-8 to default)
(The command is accepted when all unit LED's flash briefly)

It is recommended to reset the unit before performing a setup
Always check for correct signals after the setup

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

Step 1 – 0 Enter Setup

B
D
Next C   1 Save and Exit
step E
F   2 Exit no change accepted
A

Step 2 – Setup valve type

B   Default   SRC/ARC   LKB   Unique   SMP-SC
+/- 5mm   Series 700   (LKLA-T)   Mixproof,   SMP-BC
D   (**Only** used   SRC-PV   SMP-TO
Next C   when self   spillage-free   SMP-BCA   Reset unit
step E   1 adjustment   2   3 SMP-SC   4 SBV   5
F   feature is   Unique SSV.
A   required)   SRC/ARC
Series 700

Step 3 – Set closed position

B   Default   Position stored.
D   Cleat
Next C   Activate the valve to the close position   position
step E   (De-energized)   1   5
F   auto
A

Step 4 – Set open position

B   Default   Position stored
D   Clear
Next C   Activate the valve to the open position   position
step E   (Energized)   1   5
F   auto

Step 5 – Set upper seat lift.

B   Default   Position stored
D   Activate the valve to upper seat lift. When   Clear
Next C   using an external sensor the sensor must be   position
step E   active when "1" is pushed   1   5
F   auto
A

Step 6 – Set lower seat lift.

B   Default   Position stored.
Next D   Activate the valve to lower seat lift. When   Clear
step C   using an external sensor the sensor must be   position
E   active when "1" is pushed   5
F   auto
A

Step 7 – Set self adjust (Recommended: Disabled)

B   Default   Associated   Associated   Associated
Next   Disabled   with   with   with
step D   closed/   closed   open   Disable
C   open   position   position   function
E   1 position   2   3   5
F
A

Step 8 – Setup maintenance

B   Default   90 days   180 days   270 days   360 days
Next   Disabled
step D   Disable
C   function
E   1   2   3   4   5
F
A

25

6 Setup diagram

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

6.2 ThinkTop setup utilising local 'I' and 'II' keys

General

Default is:	Step 2, tolerance is +/- 5mm
	Step 3-8, disabled

Timeout:	A 60 sec. timeout is started as soon as any button(s) are released
	On timeout the setup is exited with no changes saved

Flashing LED means no value set. Steady LED means value set as shown
[D] LED: Active during set-up: Flashing in step 1
                                    Steady in all other steps

Or during operations, error condition: Steady showing hardware fault, indication pin out of range
                                          Flashing showing software fault

General commands in each step (except step 1):

ⓘⓘ   Next step / skip step   (In step 3-6 the program automatically moves to the next step when a position is stored)

ⓘⓘ5s   Clear / disable step   (In step 2 this resets the unit to default)
                                              (The command is accepted when all unlit LED's flash briefly)

It is recommended to reset the unit before performing a setup

Symbols

ⓘ   Push local key "I"

ⓘⓘ   Push local key "II"

ⓘⓘ5s   Hold key "II" for 5 sec

Simple representation of LED indication:

Yellow	B ☐
IR-Reciver	○
Red	D 🟥 Steady LED
Yellow	C ☐
Green	E ☐
Orange	F ☐
Yellow	A ▨ Flashing LED

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

ⓘ Enter Setup

Step 1 –
B
ⓘ Save and Exit
D
Next C
ⓘⓘ5s Exit no change accepted
step E
F
A

Step 2 – Setup valve type
B Default
+/- 5mm
D
Next C
step E
F
A

ⓘ Next step

SRC/ARC Series 700 (Only used when self adjustment feature is required)	LKB (LKLA-T)	Unique Mixproof, SRC-PV spillage-free SMP-SC	SMP-SC SMP-BC SMP-TO SMP-BCA SBV Unique SSV SRC/ARC Series 700

Step 3 – Set closed position
B Default
D
Next C
step E
F
A

Activate the valve to the closed position (De-energized)

Position stored

auto

Step 4 – Set open position
B Default
Next D
step C
E
F

Activate the valve to the open position (Energized)

Position stored

auto

Step 5 – Set upper seat lift
B Default
Next D
step C
E
F
A

Activate the valve to upper seat lift. When using an external sensor the sensor must be active when "ⅠⅠ" is pushed

Position stored

auto

Step 6 – Set lower seat lift
B Default
D
Next C
step E
F
A

Activate the valve to lower seat lift. When using an external sensor the sensor must be active when "ⅠⅠ" is pushed

Position stored

auto

Step 7 – Set self adjust (Recommended: Disabled)
B Default
Disabled
Next D
step C
E
F
A

ⓘ Next step

Associated with closed/ open position	Associated with closed position	Associated with open position

Step 8 – Setup maintenance
B Default
Disabled
Next D
step C
E
F
A

ⓘ Next step

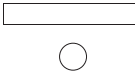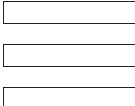| 90 days	180 days	270 days	360 days	+90 days (Up to max. 18 years)

6 Setup diagram

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.
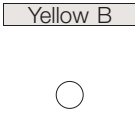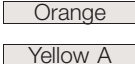
6.3 ThinkTop quick setup guide

Valve: Unique SSV, SRC/ARC type NC (selfadjustment disabled)

Push:	I	- and wait until red LED flashes
Push:	I	
Push:	II	- hold for 5 sec (clear all stored parameters)
Push:	II	(red + yellow LED)
Push:	II	(red + yellow + green LED)
Push:	II	(red + yellow + green + orange LED)
Push:	II	(red + yellow + green + orange + yellow LED)
Push:	I	
Push:	II	- to approve valve down (closed)
	Activate	Valve opens
Push:	II	- to approve (open)
Push:	I	(no upper seat-lift)
Push:	I	(no lower seat-lift)
Push:	I	(no self adjustment)
Push:	I	(no maintenance)
Push:	II	Red LED flashes (save & exit by push)
	Setup done	

Valve: SRC/ARC type NO (selfadjustment enabled)

Push:	I	- and wait until red LED flashes
Push:	I	
Push:	II	- hold for 5 sec (clear all stored parameters)
Push:	II	(red + yellow LED)
Push:	I	
	Activate	Valve closes
Push:	II	- to approve valve closed
Push:	Deactivate	Valve opens
Push:	II	- to approve valve is open
Push:	I	(no upper seat-lift)
Push:	I	(no lower seat-lift)
Push:	II	= self adjustment
Push:	I	
Push:	I	(no maintenance)
Push:	II	Red LED flashes (save & exit by push)
	Setup done	

Valve: LKB Valve (Butterfly) NC

Push:	I	- and wait until red LED flashes
Push:	I	
Push:	II	- hold for 5 sec
Push:	II	(red + yellow LED)
Push:	II	(red + yellow + green LED)
	I	
Push:	II	- to approve valve closed (indication stem up)
Push:	Activate	LKB valve- open position (indication-stem down)
Push:	II	- to approve valve is open
Push:	I	(no upper seat-lift)
Push:	I	(no lower seat-lift)
Push:	I	(no self adjustment)
Push:	I	(no maintenance)
Push:	II	Red LED flashes (save & exit by push)
	Setup done	

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

Valve: LKB Valve (Butterfly) NO

Push:	I	- and wait until red LED flashes
Push:	I	
Push:	II	- hold for 5 sec (clear all stored parameters)
Push:	II	(red + yellow LED)
Push:	II	(red + yellow + green LED)
Push:	I	
	Activate	- to approve valve closed (indication stem up)
Push:	II	- to approve valve closed
Push:	Deactivate	LKB valve-open position (indication-stem up)
Push:	II	- to approve valve is open
Push:	I	(no upper seat-lift)
Push:	I	(no lower seat-lift)
Push:	I	(no self adjustment)
Push:	I	(no maintenance)
Push:	II	Red LED flashes (save & exit by push)
	Setup done	

Valve: Unique mixproof Valve (with lower seat-lift)

| Push: | I | - and wait until red LED flashes |
Push:	I	
Push:	II	- hold for 5 sec (clear all stored parameters)
Push:	II	(red + yellow LED)
Push:	II	(red + yellow + green LED)
Push:	II	(red + yellow + green + orange LED)
	I	
Push:	II	- to approve valve closed
	Activate	Valve opens
Push:	II	- to approve valve is open
Push:	Activate	Lower seat-lift active
Push:	II	- to approve
Push:	I	(no self adjustment)
Push:	I	(no maintenance)
Push:	II	Red LED flashes (save & exit by push)
	Setup done	

7 Fault finding

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.

7.1 Fault finding and LEDs

Below is stated the meaning of the LEDs' indications for fault finding in connection with the operation of the ThinkTop.

7.1.1 status LED (Red)

Red flashing:	Unit in set-up mode or internal software fault. If internal software fault, re-programme unit.
Red steady:	Unit in set-up mode or internal hardware fault. If internal hardware fault, check if magnet is in range and check correct wiring.
Red steady:	No. communication between ThinkTop and the DeviceNet master, i.e. the bus is offline. If the Red LED is with random intervals and duration, it suggests that the bus is unstable, and the DeviceNet network should then be investigated. There are numerous issues that could lead to marginal operation of a network, bus load, voltage limits, impedance, termination, etc.

7.1.2 Maintenance time out

Yellow B   1 Orange flashing: Time for maintenance has run out. The unit has been self-adjusted into a maintenance alert condition. Valve maintenance is strongly recommended. After maintenance: Disabling of maintenance/self-adjustment function is required before setting new position, however, it is strongly recommended to make a complete new set-up after valve maintenance.

Orange

Yellow A   2 Orange steady, yellow flashing (A and/or B):   The unit has been self-adjusted into a maintenance alarm condition and the feedback is lost (a minimum of seal left). Valve maintenance is required. After maintenance: Disabling of the self-adjustment function is required before setting new position, however, it is strongly recommended to make a complete new set-up after valve maintenance.

NOTE!   **The maintenance indicator lighting up, and an open or closed light flashing.....** =
Note the following:
- Self-adjustment programme is only valid for SRC/ARC valves, do not use the programme for other valve types.
- Use tolerance/valve type 1.
- In conjunction with valve type change-over; 21, 22, 31 and 32, the open position must be defined as the upper sensor position (when the indication pin is in the highest position).
- A loose top, indication pin or sensor system can also generate the alert/alarm condition.
- Removing a ThinkTop with self-adjust activated, will immediately generate an alarm condition! If the ThinkTop has to be removed, not because of a valve maintenance issue, but for some other reasons, and you want to store the already adjusted data - disable the self-adjust function before removing the ThinkTop and enable it again once the ThinkTop is back on the actuator.
- After valve maintenance a disabling of the self-adjustment function is required before setting a new position, however, it is strongly recommended to make a complete new set-up (disable all functions in step 2 valve type - and make a complete new set-up).

Unsafe practices and other important information are emphasized in this manual.
Warnings are emphasized by means of special signs. All warnings in the manual are summarized on this page.
Pay special attention to the instructions below so that severe personal injury or damage to the top unit are avoided.
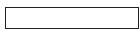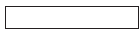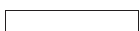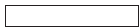
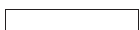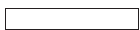## 7.2 LED indication during normal operation
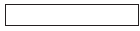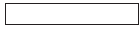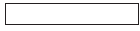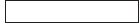
Yellow A   Yellow steady: Position A (closed valve).

Yellow B   Yellow steady: Position B (open valve).
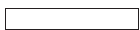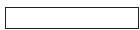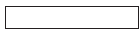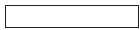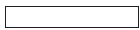
Yellow C   Yellow steady: Position C (Seat lift 1-2 or external sensors).

Green   Green steady: Solenoid valves energized.

Note! During set-up LED lights have different functions.
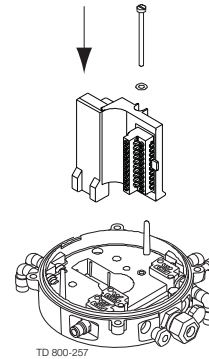
8 Maintenance

Study the instructions carefully.
Handle scrap correctly.
Always keep spare X-rings in stock.

8.1 Dismantling of ThinkTop

Step 1
1. Untighten the two Allen screws and remove the ThinkTop from the actuator.
2. Pull out X-ring (19) and replace it.

TD 800-485
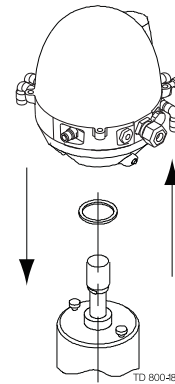
Step 2
1. Untighten the four screws.
2. Pull off cover of ThinkTop.
3. Remove X-ring (9) (grey).

TD 800-253
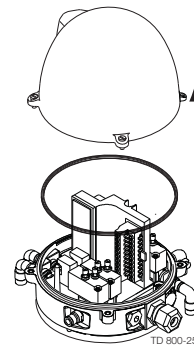
Step 3
1. Untighten screws.
2. Remove solenoid valves (up to three) and replace them with new ones.

TD 800-254
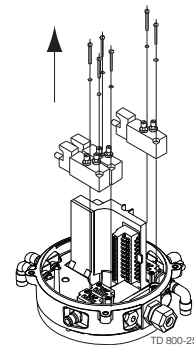
Step 4
1. To dismantle the adapter (the lower part of the ThinkTop) from base (the middle part), unscrew the three screws.
2. Turn the lower part a little clockwise and pull.
3. Replace adapter if necessary.
4. Remove the black X-ring.
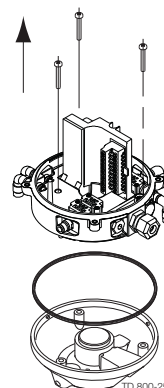
Note: Turn banjo connection!

TD 800-255

Study the instructions carefully.
Handle scrap correctly.
Always keep spare X-rings in stock.

Step 5
To remove the sensor unit untighten screw and pull out the sensor unit.
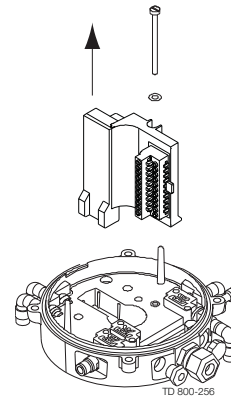
TD 900-256

8 Maintenance

Study the instructions carefully.
Handle scrap correctly.
Always keep spare X-rings in stock.

8.2 Assembly of ThinkTop

Step 1
Place sensor unit in base and tighten screw (torque: 1 Nm).

TD 800-257

Step 2
1. Replace the black X-ring.
2. Assemble base with adapter by turning adapter slightly anticlockwise and tighten the four screws (1.9 Nm).

CAUTION!
Do NOT twist the X-ring in the groove!
The X-ring is not square; The highest (h) part must be placed as fig.

h

Note:
Turn banjo connection!

TD 800-079   TD 800-258
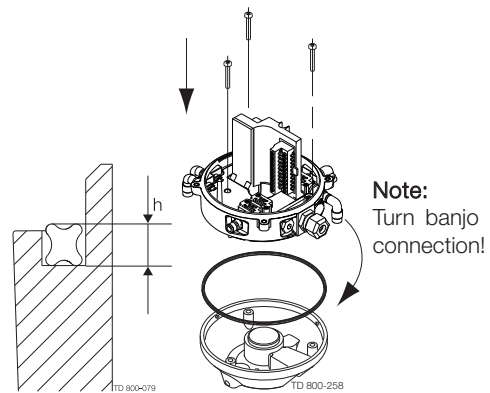
Step 3
1. Replace solenoid valves (up to three) with new ones.
2. Tighten screws (0.2 Nm).

TD 800-259
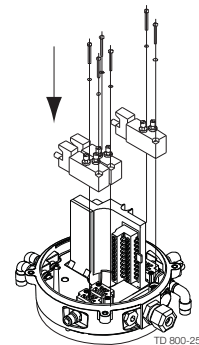
Step 4
1. Replace the grey X-ring.
2. Replace cover of ThinkTop and tighten the four screws (0.6 Nm).
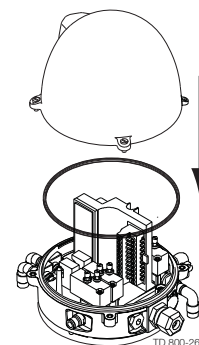
TD 800-260

Study the instructions carefully.
Handle scrap correctly.
Always keep spare X-rings in stock.

Step 5
1. Replace the black X-ring.
2. Mount ThinkTop on actuator.
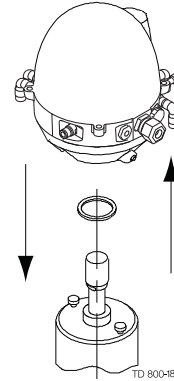
8 Maintenance

_Study the instructions carefully.
Handle scrap correctly.
Always keep spare X-rings in stock._

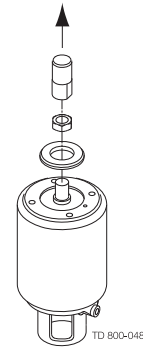## 8.3 Dismantling and assembly of Series 700 valves

Step 1
1. Remove the cover by loosening the four cover screws.
2. Separate the adapter from the base by loosening the three recess screws on top of the base.

Installation on air actuators:

TD 800-250
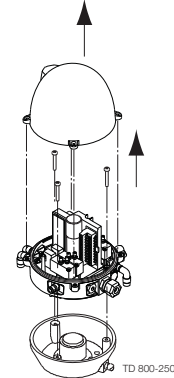
Step 2
1. Fit air fittings on actuator.
2. Position packing retainer in recess on actuator top.
3. Fit counter nut and indicator (magnet) on actuator rod. Engage approx. ¼" thread. Tighten counter nut and indicator with two wrenches.

TD 800-048

Step 3
1. Place the two O-rings in the grooves in the bottom of the adapter. Then place the adapter on the actuator top. The small O-ring must be positioned over the air hole on the actuator.
2. Fasten the adapter with the four 5/16" Allen screws.

TD 800-049
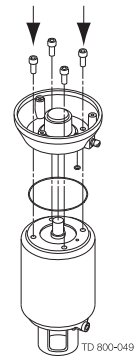
Step 4
1. Mount the base on the adapter in the position needed (can be rotated 120° in both directions). Note that one of the screw towers on the adapter has a guide recess (see * on drawing).
2. Remove x-rings (9) (grey) and (16) (black).
3. Replace with new ones.

CAUTION! Do NOT twist the X-ring in the groove! The X-ring is not square; The highest (h) part must be placed as fig.

h

TD 800-079

TD 800-251
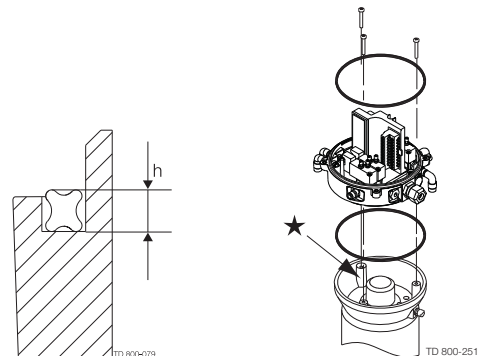
The drawings show ThinkTop Devicenet 11-25 VDC.
The items refer to the parts lists in the following sections

9.1   Drawings for ThinkTop DeviceNet 11-25 VDC
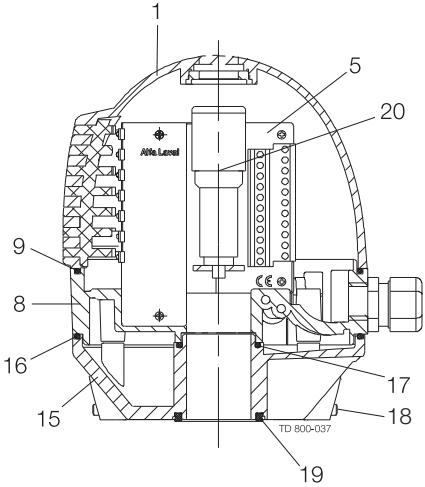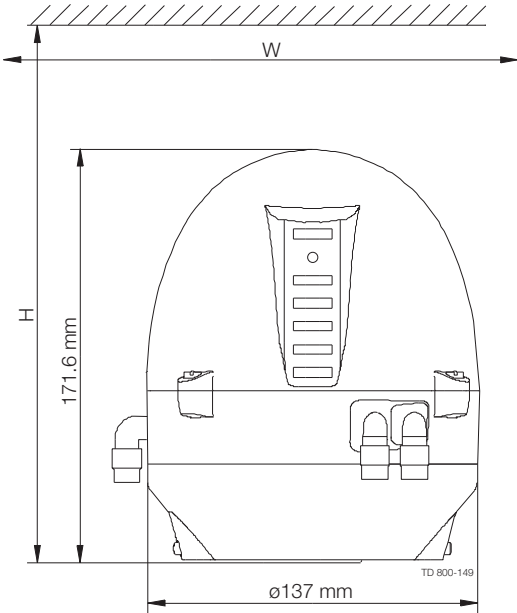
TD 800-149

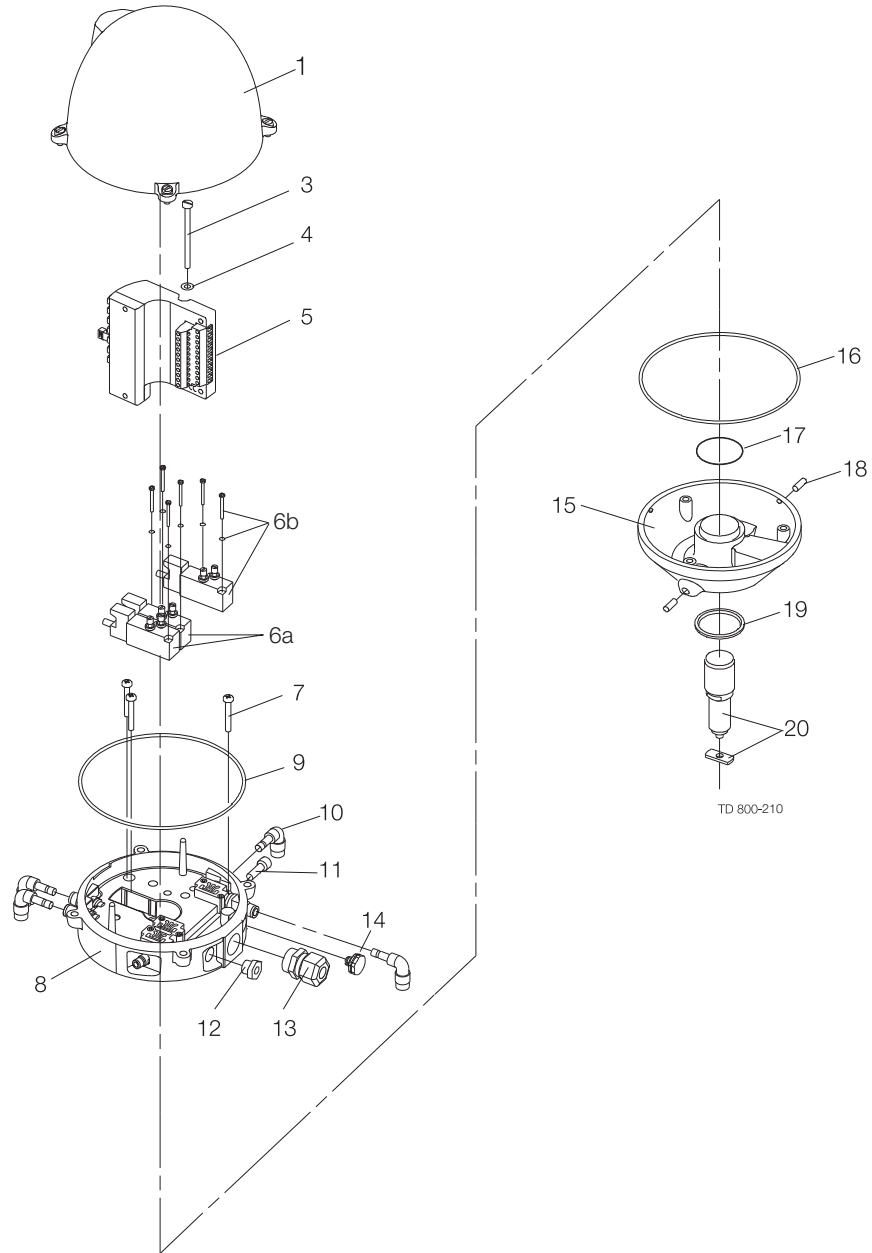| Note! This is the basic design.	
The clerance should be approximately:	
W225 x H250	(Unique SSV NC, SMP-SC/ - BV/ -TO, Unique Mixproof, MH, SBV)
W225 x H320	(Unique SSV NO)
W225 x H300	(LKLA-T)
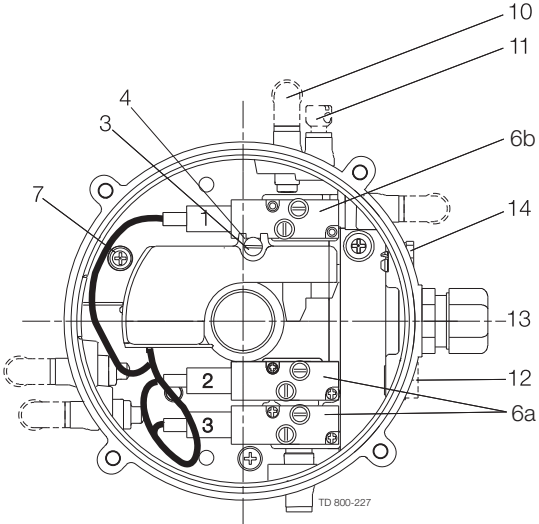
9 Part list and Service Kits

The drawings show ThinkTop Devicenet 11-25 VDC.
The items refer to the parts lists in the following sections

9.2   ThinkTop DeviceNet 11-25 VDC

TD 800-210

The drawings show ThinkTop Devicenet 11-25 VDC.
The items refer to the parts lists in the following sections

Parts list

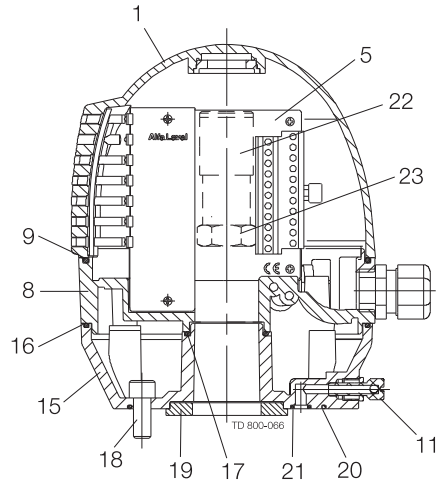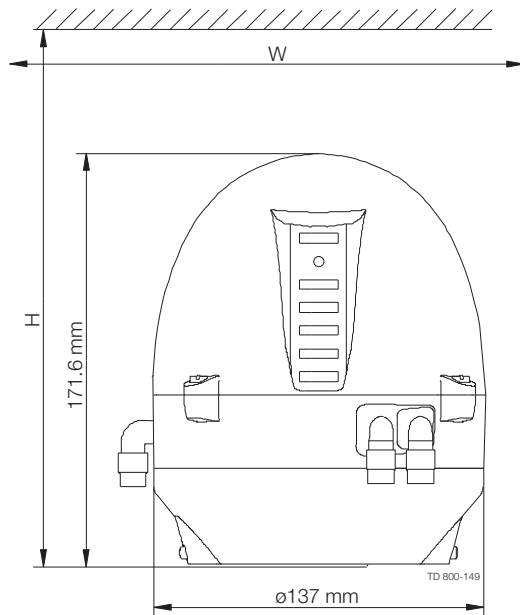| Pos.	Qty	Denomination
1	1	Shell
3	1	Screw
4	1	Washer
5	1	Sensor board
6a	1	Solenoid valve (3/2)
6b	1	Solenoid valve (3/2) or 5/2)
7	1	PT screw
8	1	Base
9	1	Special X-ring, grey
10	1	Air fittings
11	1	Blow-off valve
12	1	Thread plug, PG7, ø3 - ø6,5 mm
13	11	Cable gland, PG11 ø4 - ø10 mm
14	1	Gore Vent. mambrane
15	1	Adapter
16	1	Special X-ring, black
17	1	O-ring
18	1	Allen screw
19	1	Special X-ring
20	1	indication pin

Service kits

Denomination	Intern number
Sensor unit DeviceNet 11-25 VDC	9612-5627-04
Solenoid valve 3/2, 8 VDC	9611-99-3748
Solenoid valve 5/2, 8 VDC	9611-99-3749
Indication pin	9612-5323-01
Special indication pin, SRC-LS	9612-6370-01
Special indication pin, SSV-LS	9613-1581-01
Air fitting, ø6 mm	9611-99-3405
Air fitting, 1/4"	9611-99-3433
Gore vent	9611-99-4722
X-ring,pos. 9	9613-4564-01
X-ring, pos. 16	9612-9994-01
X-ring, pos. 19	9612-5696-01

9 Part list and Service Kits

The drawings show ThinkTop Series 700 Valves
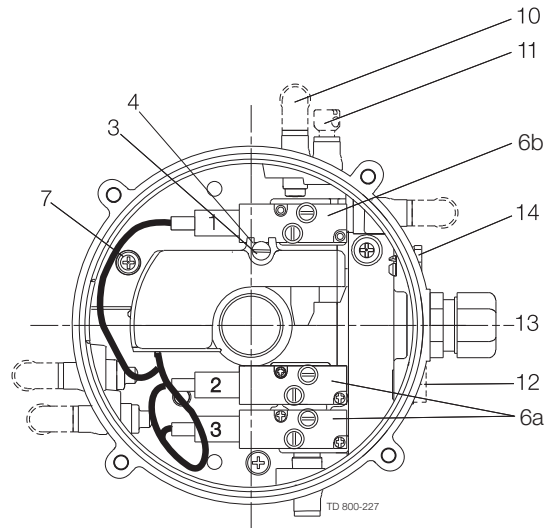*The items refer to the parts lists in the following sections*

9.3 Drawings for ThinkTop Series 700 Valves

TD 800-149

TD 800-066

TD 800-227

Note! This is the basic design.

The clerance should be approximately:
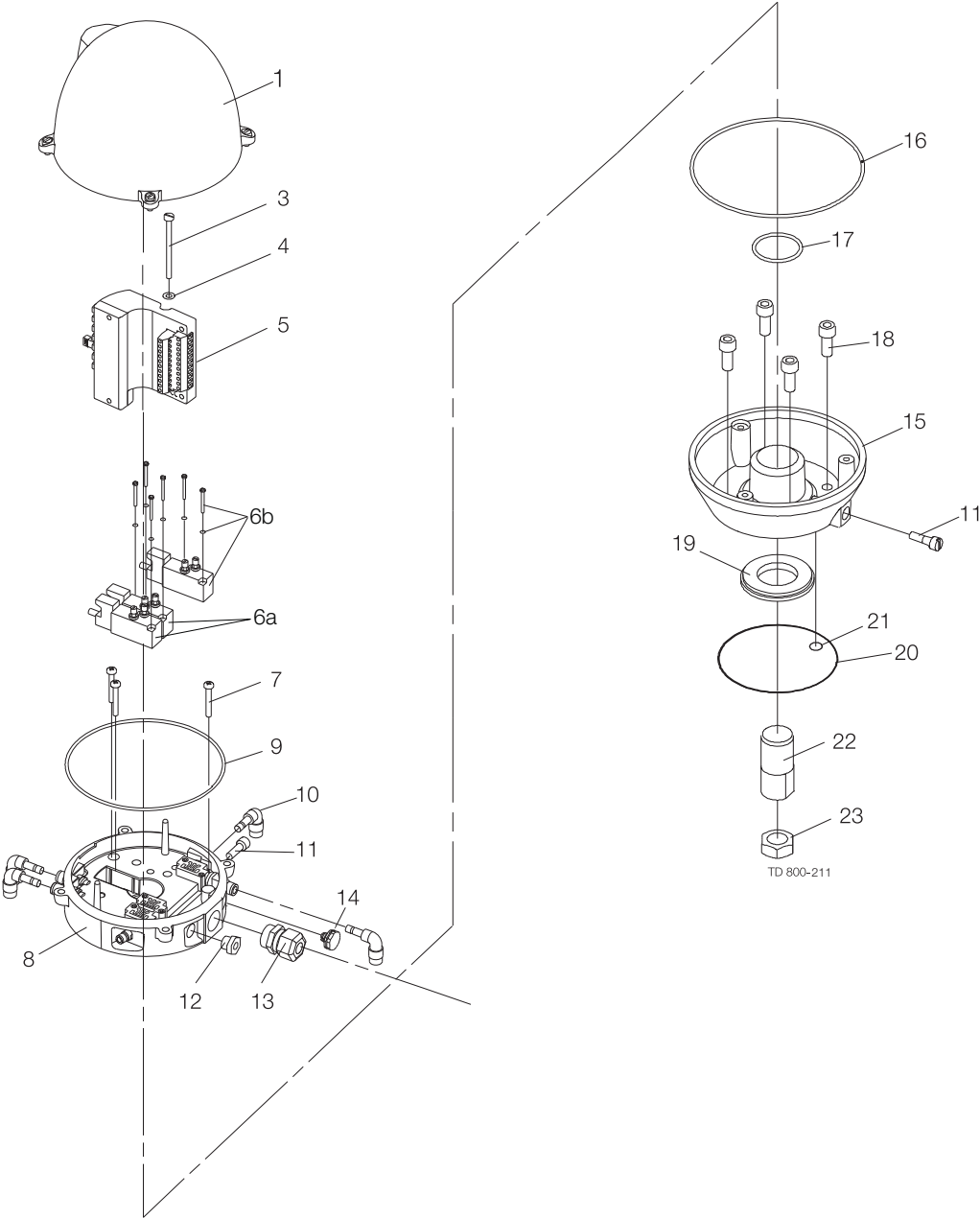
W225 x H250	(Unique SSV NC, SMP-SC/ - BV/ -TO, Unique Mixproof, MH, SBV)
W225 x H320	(Unique SSV NO)
W225 x H300	(LKLA-T)

The drawings show ThinkTop Series 700 Valves
The items refer to the parts lists in the following sections

9.4   ThinkTop Series 700 Valves

TD 800-211

9 Part list and Service Kits

The drawings show ThinkTop Series 700 Valves
The items refer to the parts lists in the following sections

Parts list

Pos.	Qty	Denomination
1	1	Shell
3	1	Screw
4	1	Washer
5	1	Sensor board
6a	1	Solenoid valve (3/2)
6b	1	Solenoid valve (3/2 or 5/2)
7	1	PT screw
8	1	Base
9	1	Special X-ring, grey
10	1	Air fittings
11	1	Blow-off valve
12	1	Thread plug, PG7
13	1	Cable gland, PG11 4-10 mm
14	1	Pressure control valve
15	1	Adapter
16	1	Special X-ring, black
17	1	O-ring
18	1	Screw
19	1	Retainer
20	1	O-ring
21	1	O-ring
22	1	Indicator pin
23	1	Nut

Service kits

Denomination	1/4" Air connec.
Sensor unit DeviceNet 11-25 VDC	9612-5627-04
Solenoid valve 3/2, 8 VDC	9611-99-3748
Solenopid valve 5/2, 8 VDC	9611-99-3749
Indication pin	9612-6357-02
Air fitting, 1/4"	9611-99-3433
Gore vent	9611-99-4722
X-ring, pos. 9	9613-4564-01
X-ring, pos. 16	9612-9994-01

How to contact Alfa Laval
Contact details for all countries are
continually updated on our website.
Please visit www.alfalaval.com to access the information directly.