

Alfa Laval ThinkTop V20

Sensing and control

Introduction

The Alfa Laval ThinkTop V20 valve indication unit offers reliable, cost-effective operation of hygienic valves. It provides standard functionality for intuitive sensing of the valve position and status, displayed on the unit's 360° light-emitting diodes (LEDs). It also provides convenient real-time valve position monitoring and easy access to historical data, making process control more reliable and accurate while saving time and money on installation, commissioning, operation and maintenance.

Application

Purpose-designed to digitalize essential on-off valve monitoring, the ThinkTop V20 is the first pure valve-sensing device that is maintenance-free and does not require manual adjustment or programming. It meets standard process system requirements for sensing and displaying the fluid handling status. It senses and indicates the valve position and status in fluid handling processes in hygienic applications across the dairy, food, beverage, home and personal care, biotechnology, pharmaceutical and many other industries.

Benefits

- More reliable real-time process control from a sensor system that does not require readjustment over time
- 70 % faster, more intuitive setup than conventional valve indication units
- Compact, aesthetic and maintenance-free design based on the ThinkTop V-series
- Choice of communication protocols digital, AS-I and IO-Link – to suit process requirements
- 360° LED visual status indication, visible from all directions

Standard design

The ThinkTop V20 is suitable for use on all Alfa Laval hygienic valves. Installation is efficient and straightforward; no expertise, adapter or special tools are required. Mount the unit on top of the valve, then tighten the two screws on the valve mushrooms. Plug the M12 female plug into the ThinkTop V20 to begin the intuitive live startup sequence. No additional steps are required. It is compatible with any Alfa Laval hygienic valve with standard mushroom connections, making it easy to install new or replace older valve indication units.



Working principles

The ThinkTop V20 is an automated valve indication unit that does not require the use of any solenoid valve. It transmits the status and condition of the valve position to any programmable logic controller (PLC) system using electrical feedback signals, such as digital, AS-Interface or IO-Link. Light-emitting diodes (LEDs) on the unit provide a 360° visual indication of the valve status, visible from any direction, displaying the current main valve position and any local faults.

The sensor system accurately detects valve stem movement and the valve position at any given moment, using microchip sensors with an accuracy of $\pm 1 \text{mm}$. Sensor chips on the sensor board calculate the angle between the axial magnetic field produced by a sensor target mounted on the valve stem to signal the current valve position. The ThinkTop V20 is compatible with all Alfa Laval hygienic valves, eliminating the need to readjust the sensors and thereby boosting productivity.

Certificates







TECHNICAL DATA

I LOT INIOAL DATA	
Material	
Plastic parts	Nylon PA 12
Steel parts	1.4301 / 304
Gaskets	Nitril / NBR
M12 chassis connector	Stainless steel / Gold plated pins
Environment	
Working temperature	-10 °C to +60 °C
Protection class (IP)	IP69K
Protection class (NEMA)	4, 4X and 6
Control board	
Communication	See interfaces section
Sensor accuracy	± 1 mm
V20 – Valve stem length	Below < 65 mm
Mean Time to Failure (MTTF)	224 years
Approvals	UL/CSA Certificate: E174191
M12 chassis connector	
AS-Interface V20	4-pin series
IO-Link interface V20	4-pin series
Digital interface V20	4-pin series
Vibration	
Vibration	18 Hz-1kHz @ 7.54g RMS
Shock	100g
Humidity	
Constant humidity	+40 °C, 21 days, 93% R.H.
Cyclic humidity	-25 °C/+55 °C, 12 cycles
Working	93% R.H.

OPERATIONAL DATA

ThinkTop LED indication

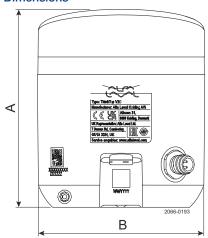
ThinkTop features a 360-degree light guide. When the sensor target is within the respective setup position band, the corresponding colour lights up.





Valve position		
Actuator	De-energised	Valve Energised

Dimensions



ThinkTop V20	mm	Inch
A	123	4.84
В	105	4.13

Digital interface

ThinkTop V20 Digital 24V

Device name	ThinkTop V20 Digital 24V	
Voltage supply	24 VDC ± 10 %; according to EN 61131-2	
	 Reverse polarity (24 VDC ± 10 %); EN 61131-2 	
Protection	 Voltage interruption and brown-out; EN61131 	
Protection	Short circuit; EN 61131	
Current consumption	Nominal 30mA (Idle)	(♦) >
	DC PNP	
PLC input card	Max rated 24V/100 mA	
UL supply	Class 2 according to cULus	
Voltage-drop	Typical 3V at 50 mA	

Terminals V20 Digi	M12, pin 1	24V	
	M12, pin 2	Valve de-energised (DE-EN)	
(••)	M12, pin 3	GND	
3 4	M12, pin 4	Main valve energised (EN)	

Terminals V20 Digital-IO 24V Retrofit IndiTop				
2 _ 1	M12, pin 1	GND		
	M12, pin 2	Main valve energised (EN)		
(• • <i>)</i>	M12, pin 3	Valve de-energised		
3 4	M12, pin 4	24V		

ThinkTop AS-Interface

Device name	ThinkTop V20 ASI3
Supply voltage	AS-Interface 29.5 – 31.6 VDC
Protection	 Reverse polarity; EN 61131-2 Voltage interruption and brown-out; EN 61131 Short circuit; EN 61131

Device name	ThinkTop V20 ASI3	
Current consumption	 Nominal: 30 mA (idle) Max 100 mA (solenoid valve and seat lift sensor active) 	
AS-I specification v3.0	 Supports extended A/B addressing and is compatible with M4 AS-I master profile, allows up to 62 nodes on an AS-I network Slave profile = 7A77 	
AS-I addressing	 Default slave address (Node) is = 0 Address (Node) changes with a standard handheld AS-I addressing device or via AS-I Master Gateway 	

Terminals V20 AS-interface				
2 _ 1	M12, pin 1	AS-i +		
3 4	M12, pin 3	AS-i -		

IO-Link interface

ThinkTop IO-Link

In addition to process indication, the IO-Link variant enables diagnostic information and features additional functionality that is unique to the IO-Link ThinkTop.

It's recommended to just add them all to the preferred IO-Link configuration tool. The configuration tool will automatically match the correct IODD with the connected ThinkTop.

Device name	ThinkTop V20 IO-Link	
IO-Link supply voltage	• 24 VDC ± 10 %	
Current consumption	Nominal: 30 mA (idle)	
	Alfa Laval Anytime and ThinkTop configurator	
Download of IO-Link files	Go to www.alfalaval.com ThinkTop and documentation	
	USB IO-Link master	
IO-Link interface tool	Configuration tool	
Cable length to IO-Link master	Max 20 meters	
Transmission rate	COM 2 (38.4 kBaud)	
Minimum cycle time	• 5 ms	
Data storage	• yes	
Profiles	• na	
SIO mode	• no	
Port class	• A	

IO-Link data table

For the IO-Link version, the bit assignment and diagnostic data can be found in the manual "IO-Link Interface Description" for ThinkTop V20. Go to www.alfalaval.com ThinkTop V20 and documentation.

On ThinkTop V20 control board, using the IO-Link interface tool from ifm, all parameter settings and visualization data are available through the diagnostic connection port.

From the "IO-Link Interface Description" the table below shows an overview of the data storage parameters. When replacing a ThinkTop V-series on a process plant, some data are re-stored, included in the new ThinkTop V-series, and other data must be reassigned again, excluded in the new ThinkTop V-series.

Please note that data storage is a feature that must be actively selected in the PLC's hardware configuration when setting up the IO-link master.

Included	Excluded
RGB color	Setup data
Customized tags	Diagnostics

Electrical connections

ThinkTop V20

Terminal	Control board	Colour code wires
1	L +24V	BN (brown)
2	L -GND	BU (blue)
3	IO-Link signal	BK (black)

ThinkTop V20

M12 option (4-pin A-coded plug)

Pin numbers and terminal numbers are aligned

M12 Chassis	Control board	M12 pin assignments
plug connector	Terminal numbers	wire colours
2 _ 1	1: L +	Pin 1: BN (brown)
	2: nc	-
(• • <i>)</i>	3: L -	Pin 3: BU (blue)
3 4	4: Out1	Pin 4: BK (black)

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