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 ±1mm. 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

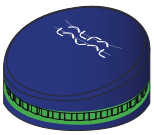
TECHNICAL DATA

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.



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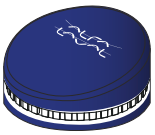

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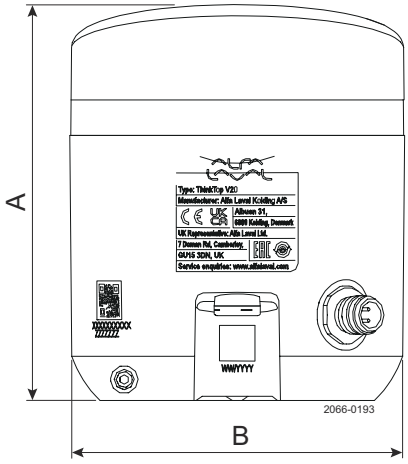
Valve position		
Actuator	De-energised	Valve Energised

Dimensions



ThinkTop V20	mm	Inch
A	123	4.84
B	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
Protection	• Reverse polarity (24 VDC ± 10 %); EN 61131-2 • Voltage interruption and brown-out; EN61131 • Short circuit; EN 61131
Current consumption	• Nominal 30mA (Idle)
PLC input card	• DC PNP • Max rated 24V/100 mA
UL supply	• Class 2 according to cULus
Voltage-drop	• Typical 3V at 50 mA

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

Terminals V20 Digital-IO 24V Retrofit IndiTop		
	M12, pin 1	GND
	M12, pin 2	Main valve energised (EN)
	M12, pin 3	Valve de-energised
	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		
	M12, pin 1	AS-i +
	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)
Download of IO-Link files	• Alfa Laval Anytime and ThinkTop configurator • Go to www.alfalaval.com ThinkTop and documentation
IO-Link interface tool	• USB IO-Link master • **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

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