

Primary characteristics

NAF-LinkIT, the intelligent valve controller, is designed to operate pneumatic valve actuators from control systems and electrical controllers with the analog control signal 4-20 mA, optionally superimposed by the HART-communication signal. As an alternative, the digital operation by means of FoxCom, PROFIBUS-PA and FOUNDATION Fieldbus H1 is possible.

NAF-LinkIT can also be integrated into system and application that support FDT/DTM concept according to the specification 1.2. For this purpose the required DTM:s for HART, Profibus and FoxCom are available.

The positioner has the following features:

- Auto Start with self calibration
- Self diagnosis
- Communication HART, FoxCom, PROFIBUS-PA and FOUNDATION Fieldbus H1
- Configuration by means of local keys, hand-held terminal, PC or DCS system
- Very high air output capacity
- Low air consumption
- Particularly low vibration influence in all directions
- Angular range up to 95°
- Supply air pressure up to 8 bar
- Single or double-acting
- Robust design with transparent polycarbonate cover. (Aluminium cover as optional)
- Integrated beacon style indicator
- Mounting on rotary actuators according to VDI/VDE 3845 or direct on NAF actuators
- Protection class IP 65
- Built-in independent inductive limit switches (optional)
- Output for air pressure sensors (optional)
- Option boards for 4-20 mA feedback, two binary inputs or outputs (optional)
- Pressure gauge block (optional)



NAF 370991

Specification

Type: NAF LinkIT, intelligent, electro-pneumatic, valve controller, product code no. 370991-(see page 8).

Function: NAF-LinkIT converts an analog or digital electrical signal to a predetermined position for a pneumatic actuator.

Control parameters and alarm limits can be configured by means of local keys, or on versions with communication (HART, FoxCom, PROFIBUS-PA and FOUNDATION Fieldbus H1) remote, with hand-held terminal, PC, or DCS system.

With applicable software, NAF-LinkIT can also be used to provide diagnostics of valve condition.

Application: Can be mounted directly on a NAF actuator, or with a mounting kit on other pneumatic rotary actuators.

The spindle sleeve of the NAF actuator has a slot to receive the positioner spindle. A driver pin then transfers the rotary motion from the actuator to the valve positioner. The driver pin is spring-loaded for transmission without backlash.

Design: NAF-LinkIT has a very robust and rugged design made for severe applications in the process industry. The valve controller has a very high air output capacity to fit on large size actuators and valves.

NAF-LinkIT is equipped with an integrated beacon indicator visible through the transparent cover. The beacon has red indicator markings for 90° rotation angle.

Functional specifications

Input

Two-wire system
Reverse polarity protection. standard feature

-D) Without communication

Signal range 4 - 20 mA
Operating range. 3.8 - 21.5 mA
Voltage. DC 8 - 48V
Max load. 320 Ω @ 20mA

-H) With communication HART

Signal range 4 - 20 mA
Operating range 3.6 - 21 mA
Voltage range of unloaded input signal. DC12 to 48V
Max. load 420 Ω , 8.4V at 20mA
Communication signal . . . HART, 1200 baud, FSK¹⁾ modulated on 4 - 20 mA
0.5 Vpp at 1kW load
Input impedance Zi Z =320 Ω
for AC voltage 0.5 to 10kHz with <3 dB non-linearity. Cable capacity and inductance see HART standard specifications (e.g. C<100nF).

Note Low voltage DCS control systems might have problems driving the control signal, use amplifier TV228 (optional)

-F) With communication FoxCom/digital

Input signal digital
Supply voltage DC 13 - 48V
Supply current ~9 mA @ 24V
Communication signal . . . FoxCom dig., 4800 baud FSK¹⁾ modulated on supply voltage
Input impedance ~500 Ω (0,5 - 20 kHz)

-E) With communication FoxCom/analog

Signal range 4 - 20 mA
Operating range. 3.6 - 21,5 mA
Voltage. DC 13 - 48 V
Load 650 Ω
Communication signal . . . FoxCom, 600 baud FSK¹⁾ modulated on 4 - 20mA
Input impedance ~500 Ω (0,5 - 20 kHz)

-P) With communication PROFIBUS-PA

Input signal digital
Supply voltage DC 9 - 32V
Operating current 10.5 mA +-0.5 mA (Base current)
Current amplitude. +-8 mA
Fault current Base current +4 mA by means of independent FDE-safety circuit
Data transfer Acc. to PROFIBUS-PA profile class B, based on EN 50170 and DIN 19245 part 4

-Q) With communication Fieldbus-FOUNDATION H1

Input signal digital
Supply voltage DC 9 - 32V
Operating current 10.5 mA +-0.5 mA (Base current)
Current amplitude. +-8 mA
Fault current Base current +4 mA by means of independent FDE-safety circuit
Data transfer FF Specification Rev. 1.4 Link-Master (LAS)
Function blocks AO, Transducer, Resource, PID (in preparation)

Configuration

-D) Without communication

Configuration. with local keys and LEDs

-H) With communication HART

Software IFDC / PC20 / FDT software
Hardware Modem MOD991 for PC
Also possible with local keys and LEDs

-E/F) With communication FoxCom

Software IFDC / PC20
Hardware Modem PC10
I/A Series System FBM 43 for code F
FBM 44 for code E
Also possible with local keys and LEDs

-P) With communication PROFIBUS-PA

Software IFDC / PC20 / FDT software
Hardware ProfiCard for PC
Also possible with local keys and LEDs

-Q) With communication Fieldbus-FOUNDATION H1

Software Contact NAF for further information
Hardware Contact NAF for further information for PC
Also possible with local keys and LEDs

Travel range

Rotation angle range up to 95°

Characteristics

Acting configurable: direct / inverse
Split range practicable
Characteristic curve configurable: linear / equal percentage / quick opening/ freely defined with 22 points max. (not version -A and -D)
Angle limitation configurable
Tight close range with hysteresis configurable

1) FSK = Frequency Shift Key

Travel indication mechanical / beacon

Output

Sense of action single or double acting
 Output to actuator 0 - 100% of supply air pressure

Supply

Supply air pressure 1.4 - 8 bar (20 - 115 psig)
 Supply air free from oil, dust, water acc. to IEC 654-2

Ambient conditions

Operating cond.
 acc. to IEC 654-1 Device can be operated at a class Dx location
 Ambient temperature -40 - 80 °C
 Relative humidity < 100%
 Transport and storage temperature -40 - 80 °C
 Protection class
 acc. to IEC 529 IP 65 ¹⁾

Electromagnetic compatibility EMC

Operating conditions industrial environment
 Immunity according to
 -EN 50 082-2 fulfilled
 Emission according to
 - EN 55 011
 Group 1, Class A fulfilled
 - EN 50 081-2 fulfilled
 NAMUR-recommendation
 as of May 1993 fulfilled

Additional features (not for version -A)

Autostart travel direction, zero, span, control parameters (control parameters adjustable via local keys, HART or bus communication)

Position feedback via communication (optional: current signal output 4—20 mA)

Alarms via communication
 optional up to 2 alarm outputs, galvanically separated 2 wire (no alarm: < 1 mA, alarm: > 2,2 mA)

1) To fulfill IP 65 the positioner must be pressurised with supply air pressure.

Online diagnostics via HART or bus communication

- recognizes pre- and main alarms
- determines number of cycles, movements of the valve
- shows condition of device
- state of position sensor
- exceeding travel range
- actuator is jammed (remaining control deviation),
- Interruption in feedback control system of valve controller

Additional diagnostical possibilities in control operation if equipped with pressure sensors and diagnostics software NAF-eValueate™

Performance specifications

Response characteristics

Sensitivity <0.1% of travel span
 Non linearity (terminal based adjustment) <0.4% of travel span
 Hysteresis <0.3% of travel span
 Supply air dependence <0.1%/1 bar (15 psi)
 Temperature effect <0.3%/10 K
 Mechanical vibration
 10—60 Hz up to 0.14 mm,
 60—500 Hz up to 2 g <0.25% of travel span

Air consumption (steady state)

. Appr. 0,4 Nm³/h @ 5 bar supply pressure

Air output

. 38 Nm³/h @ 5 bar supply pressure

Failure handling

- Safety position at
- Air supply failure pressure y1 and y2 = zero
 - Electric power failure pressure y1= zero and y2 = full supply pressure
 - Failure of communication recognized by configurable watch dog with response delay of 0,1s - 24 h
 - Behaviour configurable as pressure y1/ y2= zero or stop at last value or a configured value
 - Diagnostic report via communication
 - Historical status is set if alarm was activated at any time (also just short alarms)

Optional equipment specifications

Additional Inputs/Outputs (not for version -A)

-B) Binary Inputs

Two independent binary inputs with internal supply for connection of sensors, e.g. pressure switches. A connected switch is loaded with 3,5 V, 150 mA.

Both binary inputs can be used for diagnostics or also for the control functions

- close valve (0%)
- open valve (100%)
- hold last value (configurable)

-F) Position feedback 4 - 20 mA

Angle derived from valve controller feedback, Output analog, galvanically separated, two-wire system acc. to DIN 19234 for external supply

Supply voltage 8 - 36 V DC
 Signal range 3.8 - 20.5 mA
 0% and 100% configurable
 device fault < 50 µA

One binary output alarm, galvanically separated, failure source configurable

two-wire system acc. to DIN 19234
 Supply voltage 8 - 36 V DC
 Signal range 4 - 20 mA
 Logic < 1 mA, no alarm
 > 3 mA, alarm
 device fault < 50 µA

-P) Two Binary Outputs (not version -A)

Input angle derived from valve controller feedback
 Output binary galvanic separated 2 limit signals open collector
 Supply voltage external max 16 VDC
 Logic < 1 mA, limit value not exceeded
 > 2,2 mA, limit value exceeded
 device fault < 50 mA

Built-in Limit Switch

-T) Inductive Limit Switch (NAMUR)

Two-wire system
 Input position measured mechanically
 Output 2 inductive proximity sensors acc. to NAMUR for connection to a switching amplifier with an intrinsically safe control circuit

Current consumption
 Vane clear > 2,2 mA
 Vane interposed. < 1 mA

For control circuit with the following electrical values

Supply voltage DC 8V, Ri approx. 1 ohm
 Residual < 10% p.p.
 Permissible line resistance < 100 kohm
 Response characteristic
 Switching differential < 1%
 Switching point repeatability. < 0.2%

-W) Inductive Limit Switch

Model: Pepperl&Fuchs NBB2-V3-E2
 Three-wire system
 Input position measured mechanically
 Output 2 inductive proximity sensors
 Supply voltage 10 - 30 V DC

-Y) Inductive Limit Switch

Model: Pepperl&Fuchs NBB3-V4-Z4
 Two-wire system
 Input position measured mechanically
 Output 2 inductive proximity sensors
 Supply voltage 5 - 60 V DC

Optional feature

-B) Built-in Pressure Sensors

For output air pressures to actuator
 Indicating range 0—8 bar
 Accuracy 0,5 %
 Temperature influence 0,5% / 10K (-30 - 80°C)

Connection manifold with Gauges

-M (Manifold with manometer-LEXG)

Lateral attachment to valve controller with 3 gauges
 Indicating range 0 - 10 bar
 Error limit Class 1.6

Physical specifications

Materials

Housing Aluminium (Alloy No. 230) finished with DD-varnish white
 Cover Transparent polycarbonate, UV-stabilised
 Feedback shaft material..... 1.4104

Weight

Double acting appr. 1.7 kg (3.75 lbs)

Electric Connection

Line entry 1 or 2 cable glands M20x1,5
for cables of diam. 6-12mm

Screw terminals 2 terminals for input,
optional 4 additional terminals
for position transmitter and 1
sensor or for 2 sensors,
another 4 additional terminals
for limit switches,
wire cross section up to 2.5 mm²

Mounting

NAF actuator NAF standard

Connection to rotary
actuators VDI/VDE 3485 with mounting
kit -EBZG-R

Safety requirements

CE label

Electromagnetic
compatibility²⁾ 89/336/EWG

Low-voltage regulation . . . 73/23EWG not applicable

Safety

(only with optional feature -D, metallic cover)

According to EN 61010-1
(or IEC 1010-1) safety class III
Overvoltage Category I

Internal fuses. not replaceable

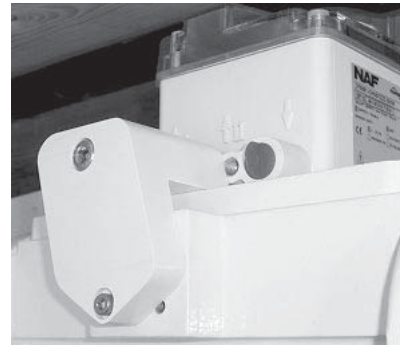
External fuses limitation of power supplies
for fire protection must be
observed acc. to
EN 61010-1, appendix F
(or IEC 1010-1).

Air connection

As standard, the air between positioner and actuator
NAF-Turnex is connected by reinforced tubes in PVC.

We can deliver as alternative:

1. Stainless steel pipes
2. Air block with air channels as per picture below.



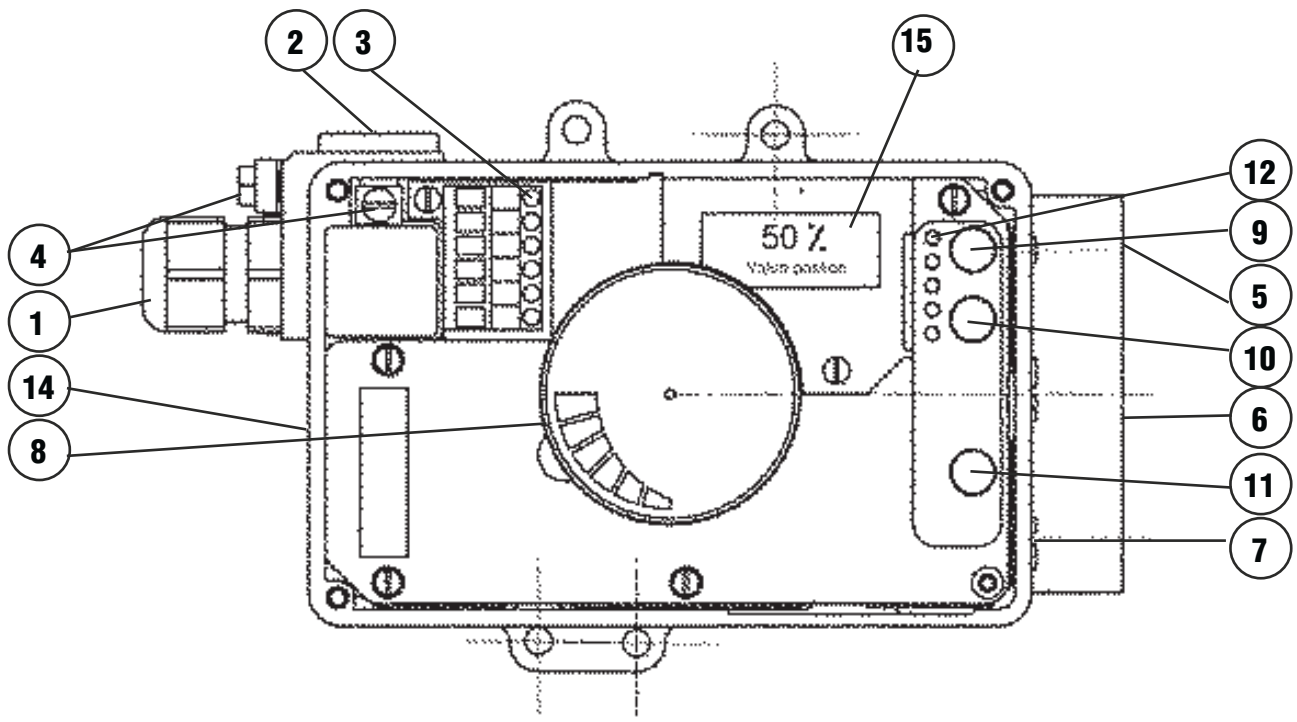
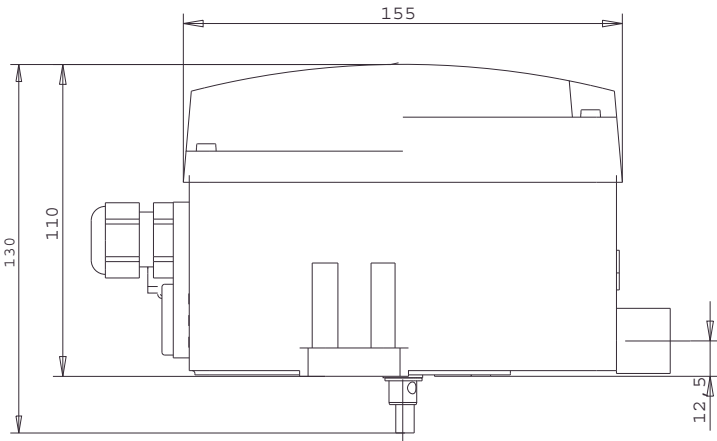
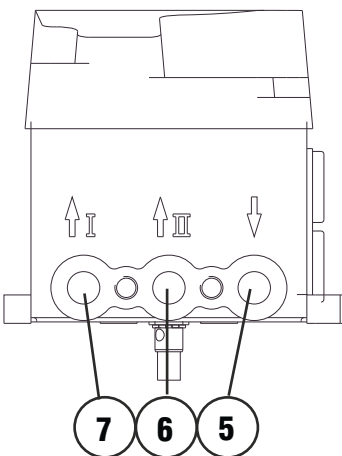
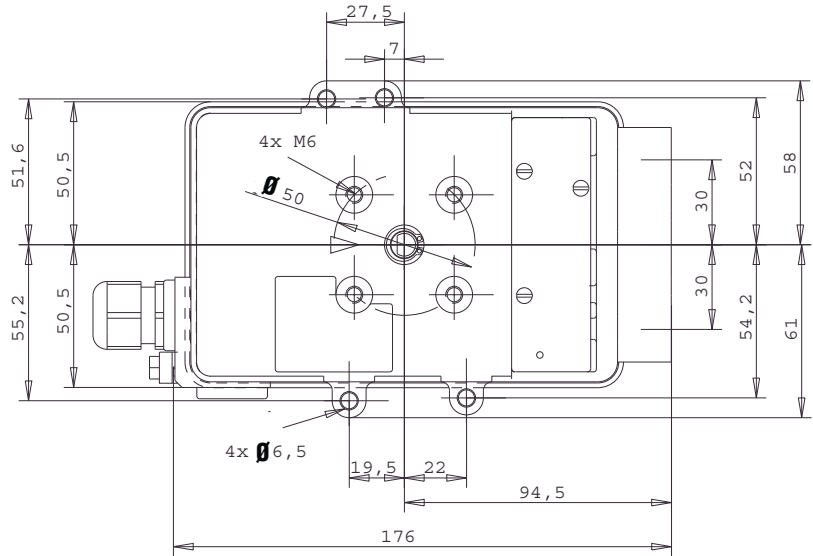
Features

- Safe and easy mounting
- Un-breakable design
- Minimizes leakage risk
- Special design makes it easy and safe to change between
direct and reverse action
- Aluminium, anodised and epoxy painted for superior
corrosion resistance
- O-ring seals

Part. No	Intended for actuator
799925-0	791390/92/94-0
799925-1	791290/92/94-1
799925-2	791290/92/94-2
799925-3	791290/92/94-3

Dimensions

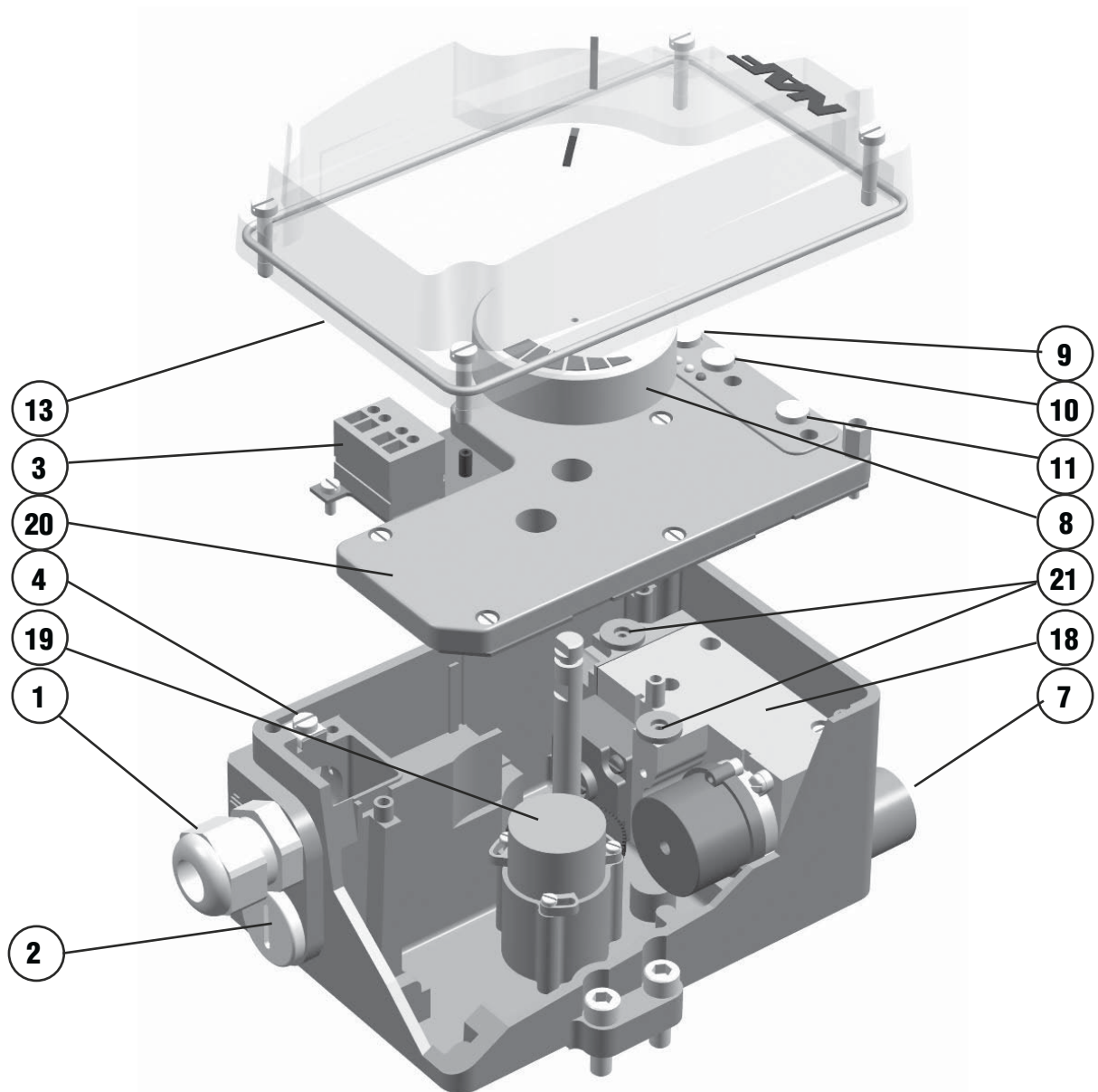
All measures in mm



Overview

Position

- | | | | |
|----|---|----|--|
| 1 | Cable gland | 12 | Status display (1 red LED, 4 green LED's) |
| 2 | Plug, interchangeable with Pos. 1 | 13 | Polycarbonate cover |
| 3 | Screw terminals (+/-) for input (w) | 14 | Data label |
| 4 | Ground connection | 15 | LCD |
| 5 | Female thread 1/4-18 NPT for air supply | 18 | Pneumatic unit with spool valve |
| 6 | Female thread 1/4-18 NPT for output y2 | 19 | Position potentiometer |
| 7 | Female thread 1/4-18 NPT for output y1 | 20 | Printed circuit board with EMC-cover |
| 8 | Beacon indicator | 21 | Connection for pressure sensors (optional) |
| 9 | Key UP | | |
| 10 | Key DOWN | | |
| 11 | Key M | | |



Product code

Example 370991 -C H N S 7 ZZZ -BV08
 1 2 3 4 5 6 7 8

NAF-LinkIT, Intelligent Valve Controller for NAF double acting actuator, HART-com. and two built-in pressure sensors with LCD-display.

1. Type

Intelligent Valve Controller for Rotary Actuators. 370991

2. Version

Double acting -C

3. Input/Communication

Digital, w/o communication (4-20 mA) D

FoxCom (4-20mA / IT1) E

FoxCom (digital / IT2) F

HART (4-20mA) H

PROFIBUS-PA P

FOUNDATION Fieldbus H1 Q

4. Additional Inputs/Outputs

Two Binary inputs B

Potentiometer Input D

Position feedback 4-20mA F

Prepared for additional In-/Outputs N

Two Binary outputs P

5. Built-in limit switch

Without S

Inductive limit switch expl. prot. EEx ia IIC T6 (NJ2-V3-N) ¹⁾ T

Inductive limit switch (NBB2-V3-E2) 3 wire. W

Inductive limit switch (NBB3-V4-Z4) 2 wire. Y

6. Cable Entry

M20x1,5 with plastic cable gland 7

7. Electrical classification

Without ZZZ

EEx ia IIC T4 (cenelec) ^{2) 5)} EA4

IIG EEx ia IIC T6/T4 (ATEX) ^{2) 3)} EAA

8. Optional Features

Two built-in pressure sensors for output to actuator p₁ and p₂ ⁶⁾ -B

Metallic c -D

Tag.No. Labeling Stamped with weather resistant color -G

Tag.No. Labeling Stainless steel label fixed with wire -L

Custom Configuration -T

LCD-display with language English/German/Swedish included, for other languages, contact NAF (Display is included as standard) ⁴⁾ -V08

Auxiliary

Manifold, gauges manifold (connection 1/4 - 18 NPT)

With three gauges for version double acting LEX 424744078 ⁷⁾ -M

Mounting kit for:

NAF-Turnex, when delivered together with actuator. Included

NAF-Turnex, wh

Rotary actuator acc. to VDI/VDE 3845 with 20 mm shaft height (79127X-220,-240) 34920650

Rotary actuator acc. to VDI/VDE 3845 with 20 mm shaft height (79127X-250,-260) 34920651

Rotary actuator acc. to VDI/VDE 3845 with 30 mm shaft height (79127X-270,-280) 34920652

(1) Explosion protection only with Electrical classification EA4 & EAA

(2) Only with Optional Feature -D, metallic cover

(3) Only with input /communication F, H, P and Q

(4) Not with inputs/communication E, F

(5) Only with input/communication D, E

(6) Only with electrical classification EAA.

(7) Can not be combined with Air block

