

STATOP 600 Series BI-LOOP PID CONTROLLERS



600 ADVANCE Series

- Simple, intuitive configuration and operation
- Customizable alphanumeric messages
- Multiple configurable logical and mathematical functions
- Advanced setpoint programmer
- 2-year warranty

Measure up



STATOP 600 Series

Advantages & and special features

ADVANCE Series

The STATOP 600 ADVANCE Series PID controllers constitute a family of products designed to control the temperature and other physical quantities (pressures, flow rates, etc.) in industrial processes and manage the positioning of power-operated valves.

The comprehensive 600 Series comprises 3 high-performance models: STATOP 648 - 689 - 696, with each distinguished by its dimensions (1/16, 1/8 and 1/4 DIN), the extent of the information displayed and the number of inputs and outputs (from 10 to 31).

Simple configuration

Configurable in just 8 steps*, without the user's manual, and in just a few minutes directly using the controller's keyboard or the PYROtools configuration software on a PC.

*Configuration available with one control loop and 3 outputs

Advanced, customizable functions

The 600 Series offers a large number of functions such as recipes, a setpoint programmer, logical and mathematical blocks, timers, energy meters and alerts for preventive maintenance. These configurable functions can be saved and re-used for future applications.

Universal solution

With their universal input and Modbus RTU communication, the 600 Series is simple to integrate in the set of command systems or PLCs.

Intuitive use

Equipped with a backlit LED screen indicating all the process information, the 600 Series is simple and intuitive to learn for any operator.

Smart display

More than 300 customizable preconfigured alphanumeric messages provide clear, accurate information on the process, such as the diagnosis, alarms and process status and help you with configuration.

Examples of display texts: **ALARM, HEAT, 4-20 MA**

New generation of process controllers demanding industrial



Up to 10 I/Os



Up to 15 I/Os



Simple, clear operator interface

BI-LOOP temperature and designed for the most processes

Much more than just a controller...

With their logical and mathematical blocks and their counting functions, the STATOP 600 Series can replace a small PLC or an energy counter. Reduce the size, cost and inventory of your controllers.

Control of energy costs

Equipped with an internal energy counter, the STATOP 600 Series models calculate and indicate your energy consumption on the process controlled, in kW and/or financial units (e.g. €).

Integrated maintenance systems

Particularly useful for programming preventive maintenance operations, the STATOP models can count the commands and can be used to program alarm thresholds. The operator is informed by a message on the display detailing the maintenance required on the actuators.

PYROtools assistant

The PYROtools software can be used to set up an extended configuration, create working recipes and upgrade the controller's firmware via a PC without having to power the controllers.



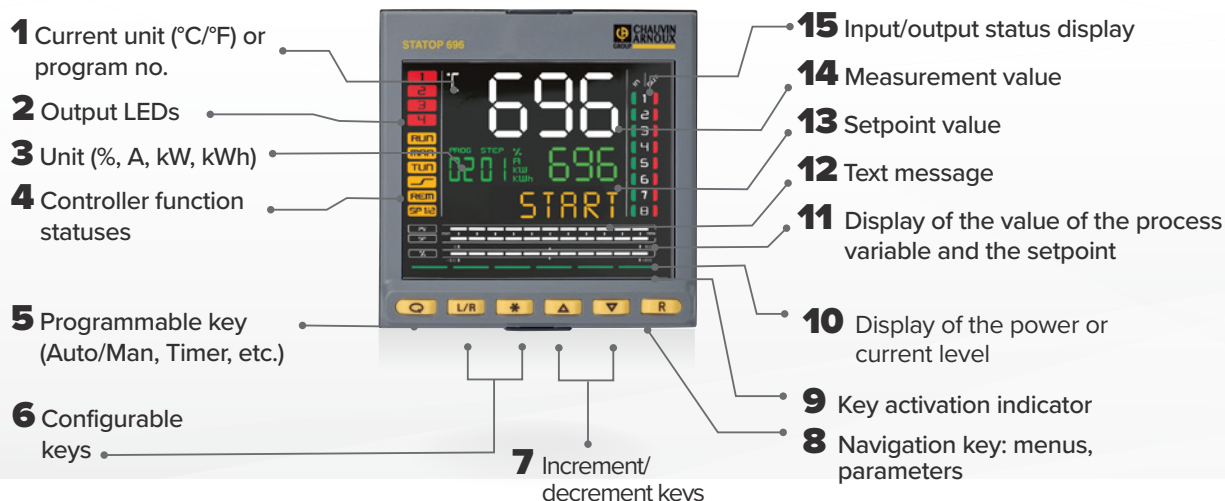
Save time

Up to 5 recipes of 25 parameters can be saved and re-used on the controller.



Up to 31 I/Os

All the information in the blink of an eye!



APPLICATIONS

Temperature & processes

STATOP 600 ADVAN multi-function BI-LO controllers

Choice of control

With the STATOP 600 Series, you can choose the type of control which suits you.

Use of two independent PID loops or use of the Cascade or Ratio functions.

Quick, accurate control



Thanks to its extremely fast measurement processing in 120 or 60 ms, the sampling rate of the new 600 Series allows quick reactions to any changes in your process, even with the two integrated control loops.

Optimization of the settings

Advanced tuning algorithms guarantee stable, optimum PID settings, including with critical or very fast thermal systems. Depending on your control requirements, these settings can be activated manually or automatically.

Fault detection

A complete diagnostic is performed

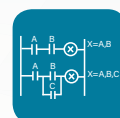
- ✓ if a probe is broken or incorrectly connected,
- ✓ if the load is cut off totally or partially,
- ✓ if there are variables outside the specified range or if there are anomalies in the control loop.

Quick indication of a failure helps to limit production losses and save energy.

32 functional application blocks

Thirty two AND, OR or Timer functional blocks can be used to create customizable logical sequences and 8 mathematical blocks for comprehensive, flexible control of the machine.

The hardware resources of the controller are operated without any need to inform external devices (e.g. timers and small PLCs).



Timer

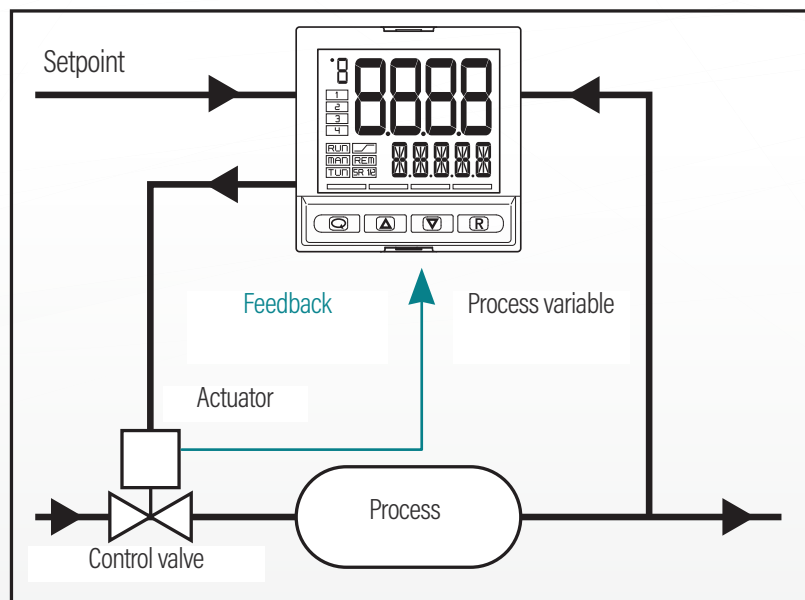


Three types of timer are available to define

- ✓ time-outs before activation of the settings,
- ✓ setpoint value hold times
- ✓ setpoint changes programmed over time.

Control of power-operated valves

The 600 Series is equipped with algorithms for controlling power-operated valves. This function can be used to manage the settings of valves with or without feedback. Another practical feature is that the valve's position is calculated and displayed on screen.



CE Series: OP industrial

Setpoint programmer



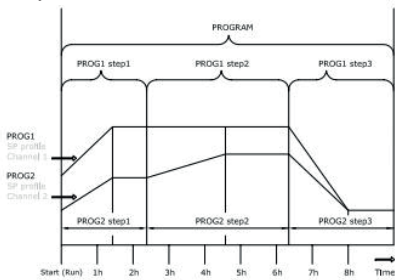
The temperature profiles can be programmed in up to **128 steps** which can be grouped and saved in **16 programs**, with programmable ramps, holds and event inputs and outputs.



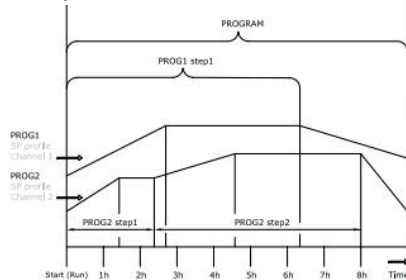
With the programmers, the two programs linked to the two control loops can be used in two ways:

- synchronously: time synchronization
- asynchronously: unlinked physical data

Synchronous

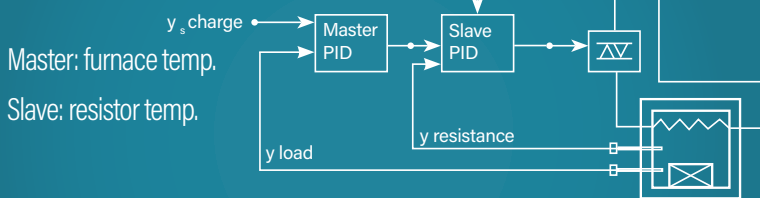


Asynchronous

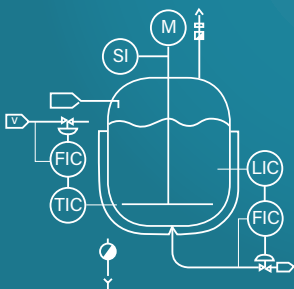


Examples of bi-loop control applications

- ✓ Furnace temperature supervision with monitoring of the resistor temperatures



Master: furnace temp.
Slave: resistor temp.



- ✓ Control of reactor temperature with double-envelope coolant-fluid flow rate

Master: reactor internal temp.
Slave: coolant-fluid flow rate

Energy counter



The Energy Monitor function enables you to calculate and monitor energy consumption, estimate the costs and report any anomalies. The values are indicated in kW and/or financial units (eg.€).

Preventive maintenance



This function of the controller allows you to monitor the life cycle of the actuators. It calculates the number of operations performed by the actuator or the operating time of the components. When compared with the average actuator life cycle, these data help you to schedule preventive replacement.

Numerous alarm and threshold functions

The alarms monitor the measurements and/or the difference between the setpoint and the measurement, with the possibility of linking up to **4 programmable alarms** to an output.



They enable:

- ✓ protection of your production equipment and your installation,
- ✓ quality monitoring by early detection of deviations from the optimum values,
- ✓ activation of an alarm in the event of threshold overruns.

8I-LOOP CONTROLLERS - 600 SERIES

TECHNICAL SPECIFICATIONS

TECHNICAL DATA		STATOP 648	STATOP 689	STATOP 696
OPERATOR INTERFACE				
DISPLAY	Type	LCD with black background		
	Visual area (L x H)	35 x 30 mm	37 x 68 mm	83 x 68 mm
	Lighting	LED backlighting, duration > 40,000 hours @ 25 °C (with brightness BACKL = 0.8)		
	PV display	No. of digits: 4 to 7 segments, with decimal point Digit height: 17 mm Colour: white		No. of digits: 4 to 7 segments, with decimal point Digit height: 23 mm Colour: white
	SV display	No. of digits: 5 to 14 segments, with decimal point Digit height: 7.5 mm Colour: green	No. of digits: 4 to 7 segments, with decimal point Digit height: 14 mm Colour: green	No. of digits: 4 to 7 segments, with decimal point Digit height: 11 mm Colour: green
	F display		No. of digits: 5 to 14 segments, with decimal point Digit height: 9 mm Colour: amber	No. of digits: 7 to 14 segments, with decimal point Digit height: 9 mm Colour: amber
	Measurement unit	Selectable: °C, °F or customized' Colour: as PV display		
	Controller status indications	Number: 6 (RUN, MAN, _/_, REM, SP1/2) Colour: amber		
	Output status indications	Number: 4 (1, 2, 3, 4) Colour: red		
	Configurable indicator bargraph		Type: bargraph, 11 segments Power indication: 0 ... 100 % or -100 ... 100 % Current indication: 0 ... 100 % f.s. Valve opening indication: 0 ... 100 %	
	Indicator bargraph		Type: double bargraph, 11 segments Process variable and setpoint indication: 0...100 % f.s.	
Input/output status indication (only with option)			Number: 8 inputs, 8 outputs Colour: green for inputs, red for outputs Management from FB outputs	
KEYPAD		Number of buttons: 4 silicone (Man/Auto, IN C, DEC, F) Type: mechanical		Number of buttons: 6 silicone (Man/Auto, L/R, *, INC, DEC, F) Type: mechanical

INPUTS

MAIN INPUT	Sensor type	TC, RTD (PT100, JPT100), ES1B IR sensor, linear DC		
	Accuracy	<p><u>TC input</u> Calibration accuracy: < ± (0.25 % of the value read in °C +0.1°C) Linearization accuracy: 0.1 % of the value read Cold junction accuracy: < ± 1°C at 25°C ambient temperature Cold junction compensation: > 30:1 rejection of ambient temperature change</p> <p><u>RTD input</u> Calibration accuracy: < ± (0.15 % of the value read in °C +0.4°C) Temperature drift: < ± (0.005 % of the value read in °C +0.015°C)/°C of 25°C ambient temperature Linearization accuracy: 0.1 % of the value read</p> <p><u>Linear inputs:</u> Calibration accuracy: < 0.1 % full scale Temperature drift: < ± 0.005 % full scale/°C of 25°C ambient temperature</p>		
	Sampling time	60 ms / 120 ms, selectable		
	Digital filter	0.0...20.0 s		
	Temperature measurement unit	Degree C / F, selectable on keypad		
	Signal interval	Type: linear Scale: -1,999...9,999, programmable decimal point		
	TC (thermocouple) input	Thermocouple: J, K, R, S, T, C, N Linearization: ITS90 or customized		
	RTD (resistance temperature device) input	Resistance temperature device PT100, JPT100 Input impedance (Ri): ≥ 30 kΩ Linearization: DIN 43760 or customized Max. line resistance: 20 Ω		
	DC linear input	<p>0...60 mV Input impedance (Ri): > 70 kΩ 0...1 V Input impedance (Ri): > 15 kΩ 0...5 V / 0...10 V Input impedance (Ri): > 30 kΩ 0/4...20 mA Input impedance (Ri): 50 Ω</p> <p>Linearization: linear or customized</p>		
	AUXILIARY INPUT	Sensor type	TC, RTD (PT100, JPT100), IR ES1B sensor, linear DC	
Accuracy		<p><u>TC input</u> Calibration accuracy: < ± (0.25 % of the value read in °C +0.1°C) Linearization accuracy: 0.1 % of the value read Cold junction accuracy: < ± 1°C at 25°C ambient temperature Cold junction compensation: > 30:1 rejection of ambient temperature change</p> <p><u>RTD input</u> Calibration accuracy: < ± (0.15 % of the value read in °C +0.4°C) Temperature drift: < ± (0.005 % of the value read in °C +0.015°C)/°C of 25°C ambient temperature Linearization accuracy: 0.1 % of the value read</p> <p><u>Linear inputs:</u> Calibration accuracy: < 0.1 % full scale Temperature drift: < ± 0.005 % full scale/°C of 25°C ambient temperature</p>		
Sampling time		60 ms / 120 ms, selectable		
Digital filter		0.0...20.0 s		
Temperature measurement unit		Degree C / F, selectable on keypad		
Signal interval		Type: linear Scale: -1,999...9,999, programmable decimal point		
TC (thermocouple) input		Thermocouple: J, K, R, S, T, C, N Linearization: ITS90 or customized		
RTD (resistance temperature device) input		Resistance temperature device PT100, JPT100 Input impedance (Ri): ≥ 10 MΩ Linearization: DIN 43760 or customized Max. line resistance: 20 Ω		
DC linear input		<p>0...60 mV Input impedance (Ri): > 10 MΩ 0...1 V Input impedance (Ri): > 300 kΩ 0...5 V / 0...10 V Input impedance (Ri): > 300 kΩ 0/4...20 mA Input impedance (Ri): 50 Ω</p> <p>Linearization: linear or customized</p>		
Isolation		250 V functional isolation		

TECHNICAL DATA		STATOP 648	STATOP 689	STATOP 696
OPERATOR INTERFACE				
TA INPUTS (amperometric)	Type	Isolated via external transformer		
	Accuracy	Number: 2 max. Max. capacity: x / 50 mA AC Network frequency: 50/60 Hz Input impedance (Ri): 10 Ω ±2 % f.s. ±1 digit @25 °C		
DIGITAL INPUTS	Number	3 max.	5 max.	
	Type	Voltage-free contact or NPN 24 V - 4.5 mA or PNP 12/24 V - max. 3.6 mA For further details, please see the connection diagrams		
	Isolation	250 V		
OUTPUTS				
Relays (R)	Relays (R)	Number: 4 max. Type of relay contact: N.O. Max. current: 5 A, (2 A at 45°C max. ambient temperature for UL) 250 VAC / 30 VDC, $\cos\phi = 1$ Minimum load: 5 V, 10 mA Life span: > 100,000 operations Double isolation		Number: 3 max. (4 max. with 3 relays with common contact) Type of relay contact: N.O. Max. current: 5 A, (2 A for UL certification) 250 VAC Minimum load: 5 V, 10 mA Life span: > 100,000 operations Double isolation
	Logic (D)	Number: 2 max. Type: for static relays Voltage: 24 V ±10 % (min. 10 V @20 mA) Isolation from the main input		Number: 4 max. Type: for static relays Voltage: 24 V ±10 % (min. 10 V @20 mA) Isolation from main input
	Isolated logic (M)	Number: 2 max. Type: optically-isolated MOS for PLC inputs and AC/DC loads Voltage: 30 V AC/DC max. Current: 100 mA max. Resistance ON : 0.8 Ω max. Isolation: 1,500 V		
	Triac (long-life relay) (T)	Number: 1 max. Load: resistive Voltage: 75...240 VDC Max. current: 1 A Isolation 3 kV Built-in snubber circuit, zero crossing switching		
	Continuous (C)	Number: 1 max. Current: 4...20mA Rout < 500 Ω Resolution: 12 bits Isolation from main input		Number: 1 max. 0...10 V, max. 20 mA, Rout: > 500 Ω 0...20 mA, 4...20 mA, Rout: < 500 Ω Resolution: 12 bits Isolation from main input
	Analogue retransmission (A1) (A2)	Number: 1 max. 0...10 V, max. 20 mA, Rout: > 500 Ω 0...20 mA, 4...20 mA, Rout: < 500 Ω Resolution: 12 bits Isolation from main input		Number: 2 max. 0...10 V, max. 20 mA, Rout: > 500 Ω 0...20 mA, 4...20 mA, Rout: < 500 Ω Resolution: 12 bits Isolation from main input
	Number of alarm functions	4 max., assignable to an output		
Possible configurations	Maximum, minimum, symmetric, absolute/relative, exclusion at firing, memory, reset on keypad and/or contact, LBA, HB HBB Hold Back Band if validated with Programmer function, alarm after power variation in normal operating conditions			
For VT or VT2 sensor	Voltage: 24 VDC ±10 % Max. current: 30 mA VT option of Out3		Voltage: 24 VDC ±10 % Max. current: 30 mA	
For potentiometer VP	Voltage: 1 VDC ±1 % Max. current: 30 mA			
ALARMS	Number of alarm functions	4 max., assignable to an output		
	Possible configurations	Maximum, minimum, symmetric, absolute/relative, exclusion at firing, memory, reset on keypad and/or contact, LBA, HB HBB Hold Back Band if validated with Programmer function, alarm after power variation in normal operating conditions		
POWER SUPPLY	For VT or VT2 sensor	Voltage: 24 VDC ±10 % Max. current: 30 mA VT option of Out3		
	For potentiometer VP	Voltage: 1 VDC ±1 % Max. current: 30 mA		
INPUTS / OUTPUTS				
	Digital inputs/outputs			Number: 8, in two groups (5 + 3 with separate power supply) Input : PNP 24 VDC, 5 mA Output : PNP with 24 VDC external power supply, ±25 %, max. 100 mA, protection against short-circuit with PTC Isolation : 250 V
	Relays			Number: 8 in two groups (5 + 3 relays with common contact) Type of relay contact: N.O. Max. current: 5 A (max. ambient temperature 45°C for UL), 250 VAC / 30 VDC, $\cos = 1$ Max. current for each channel: 5 A Life span: > 100,000 operations Isolation: double isolation

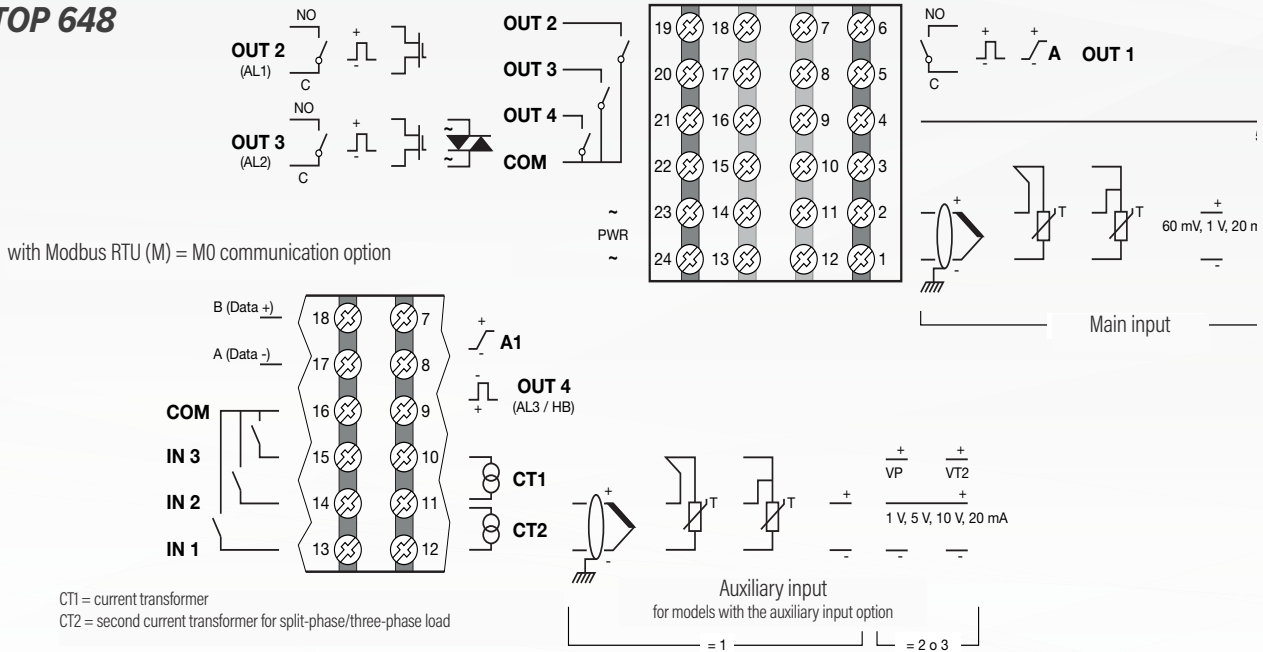
8I-LOOP CONTROLLERS - 600 SERIES

TECHNICAL SPECIFICATIONS

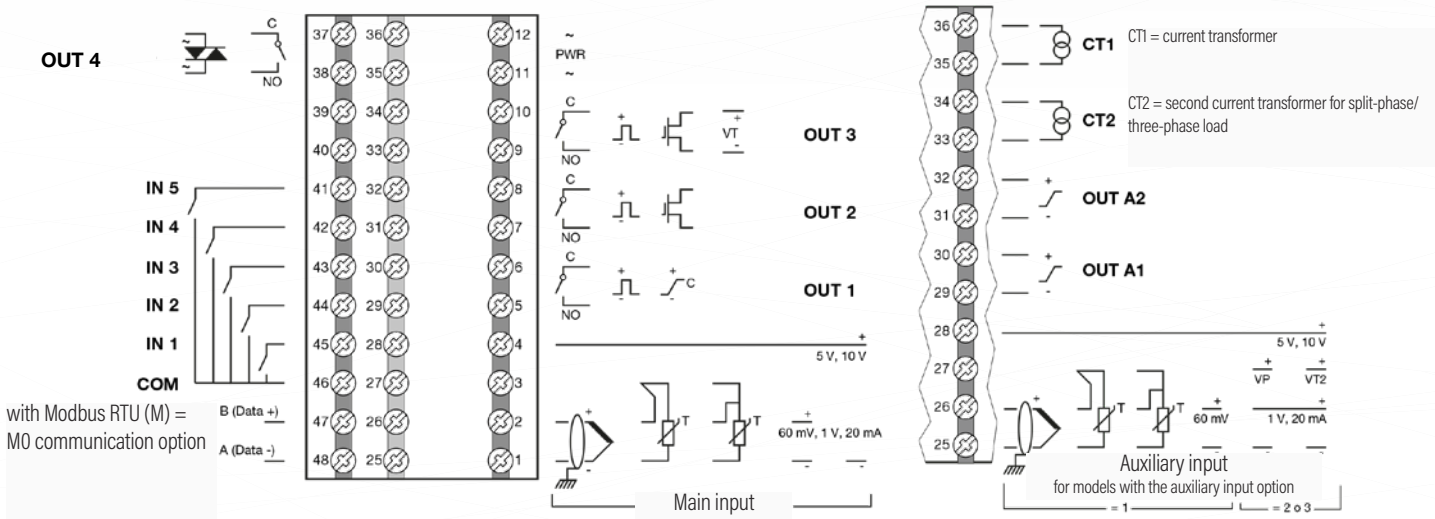
TECHNICAL DATA		STATOP 648	STATOP 689	STATOP 696
CONTROL FUNCTIONS				
CONTROL	Type	Single loop, double loop		
	Control	PID, ON/OFF, single action heat or cool, double action heat/cool		
	Control output	Continuous or ON/OFF Cycle time: constant or optimized (BF)		
	Control output for power-operated valves	OPEN/CLOSE for floating-type power-operated valve or valve with feedback with position control from the potentiometer on Relay, Static and Triac outputs		
SETPOINT PROGRAMMER (double programmer if double loop)	Number of programs	Max. 16 (if double loop 8 + 8) Start / Stop / Reset / Skip via digital inputs and/or outputs from logic operations Status outputs: Run / Hold / Ready / End		
	Number of steps	Max. 128, each with its setpoints, its ramp time and its hold time Adjustable times in HH:MM or MM:SS Max. 4 validations, configurable Max. 4 events, configurable as ramp and hold		
MULTIPLE SETPOINTS	Number of setpoints	Max. 4, selectable, from digital input Each setpoint variation is subject to the programmed gradient, which is different for increases and reductions		
LOGIC OPERATIONS 1	Digital functional blocks	Max. 32, with 4 input variables per block. The result: on controller or programmer status, on alarms and outputs. Each function contains an AND, OR-type block with TIMER.		
MATHEMATICAL OPERATIONS 1	Analogue functional blocks	Max. 8, with 2 input variables per block, with operators such as +, -, ×, ÷, mean, root extraction, etc. The result may act on the analogue variables for input to the PID loop (controlled variable, setpoint) or on the analogue outputs		
TIMER FUNCTION	Conditions	START / STOP (2 timers if double loop) STABILIZATION (the timer is active when the PV enters a programmed band around the setpoint; when counting has ended, it is possible to activate an output; close the software or change SP1/SP2 setpoint) FIRING (timed activation of the control after power on)		
ENERGY COUNTER		Calculation performed on rated line voltage and rated power of the load or at the rms current measurement on the load via CT		
DIAGNOSTICS		Short-circuit or opening of the probe (LBA alarm) Load totally or partially interrupted (HB alarm) Short-circuit of the control output (SSR alarm)		
RETENTIVE MEMORY	Type	FRAM		
		Max. number: > 1010 cycles Retention: > 10 years		
GENERAL DATA				
POWER SUPPLY	Operating voltage	100...240 VAC/VDC ±10 %, 50/60 Hz (20...27 VAC/VDC ±10 %, 50/60Hz)		
	Power dissipation	12 W max.		
	Protection	300 V / 35 V overvoltage		
	Connection	Screw and spade-lug terminals, max. cable cross-section 1 mm ²		
CONNECTIONS	Serial configuration port	Connector: microUSB		
	RS485 (option)	Baud rate: 1,200 - 2,400 - 4,800 - 9,600 - 19,200 - 38,400 - 57,600 - 115,200 bit/s Protocol: Modbus RTU Isolation from main input Screw and spade-lug terminals, max. cable cross-section 2.5 mm ²		
	Inputs and outputs	Screw and spade-lug terminals, max. cable cross-section 2.5 mm ²		
AMBIENT CONDITIONS	Use	Indoor		
	Altitude	2,000 m max		
	Operating temperature	-10 ... +55 °C (as per IEC 68-2-14)		
	Storage temperature	-20 ... +70 °C (as per IEC 68-2-14)		
INGRESS PROTECTION		20...85% non-condensing RH (as per IEC 68-2-3)		
MOUNTING	Positioning	On panel, front removal		
	Installation specifications	installation category: II Pollution degree: 2 Isolation: double		
DIMENSIONS		48 X 48 mm (1/16 DIN) Depth: 100 mm	48 X 96 mm (1/16 DIN) Depth: 80 mm	96 X 96 mm (1/4 DIN) Depth: 80 mm
WEIGHT		0.16 kg	0.24 kg	0.24 kg
CE STANDARDS	EMC compliance (electromagnetic compatibility)	Respect of Directive 2014/30/EU with reference to the EN 61326-1 standard Emission in industrial environment: Class A		
	LVD safety	Compliance with Directive 2014/35/EU with reference to the EN 61010-1 standard		
OTHER ELEMENTS				
ACCESSORIES		Programming cable for PC, USB - micro USB connectors, length 1.8 m		
		Current transformer (CT) 50/0.05 A		
		Current transformer (CT) 25/0.05 A		

CONNECTIONS

STATOP 648



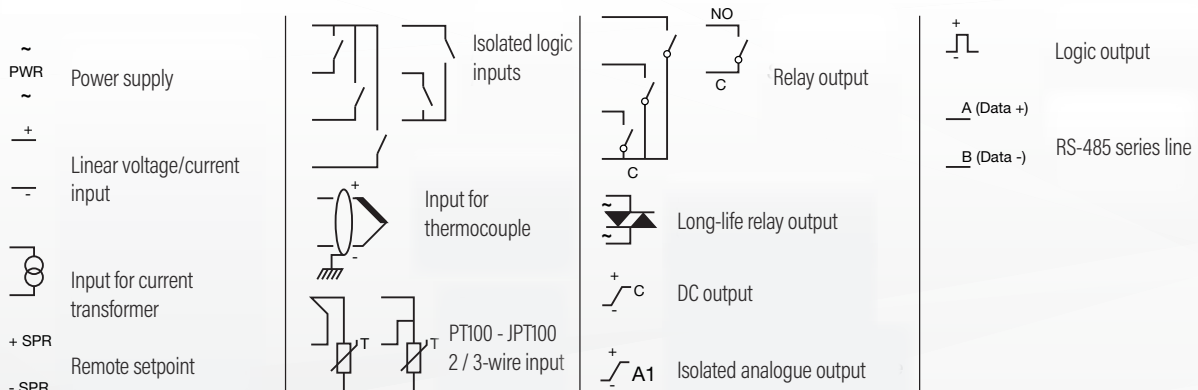
STATOP 689



INPUT/OUTPUT SPECIFICATIONS

STATOP 648 / 689

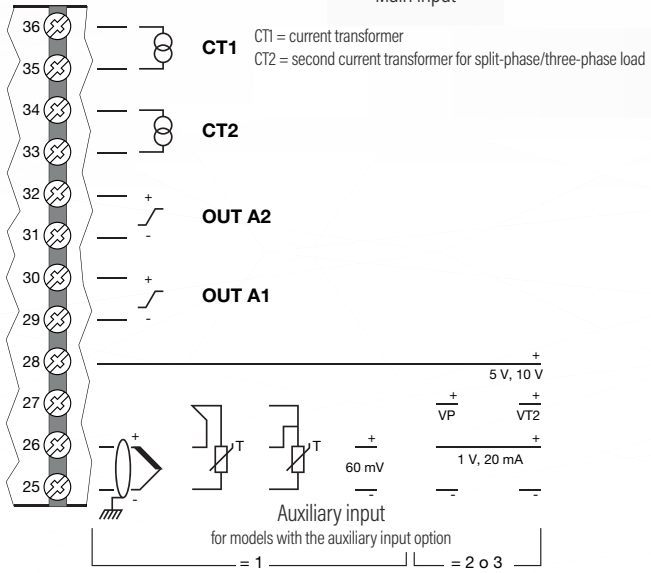
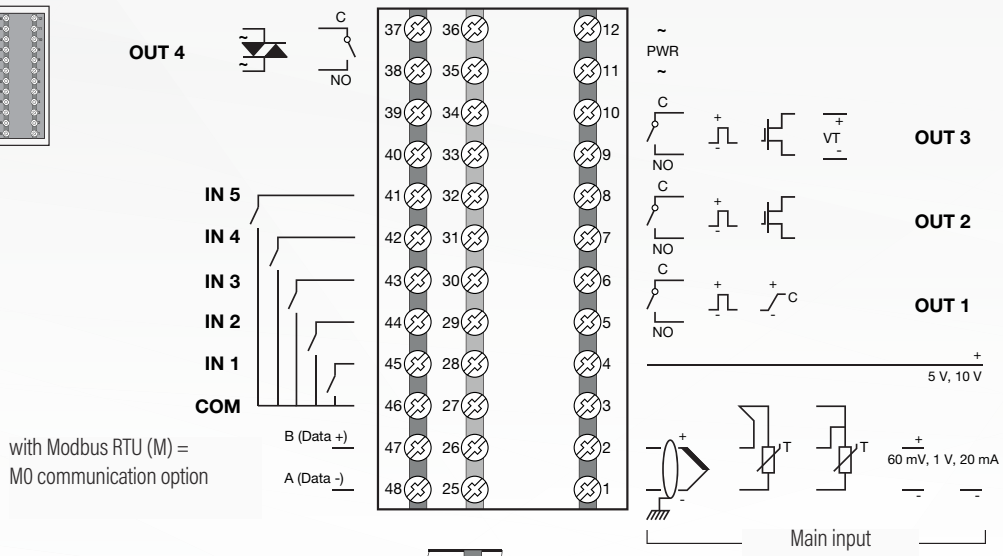
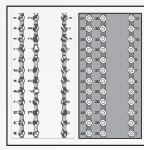
LEGEND



BI-LOOP CONTROLLERS - 600 SERIES

CONNECTIONS

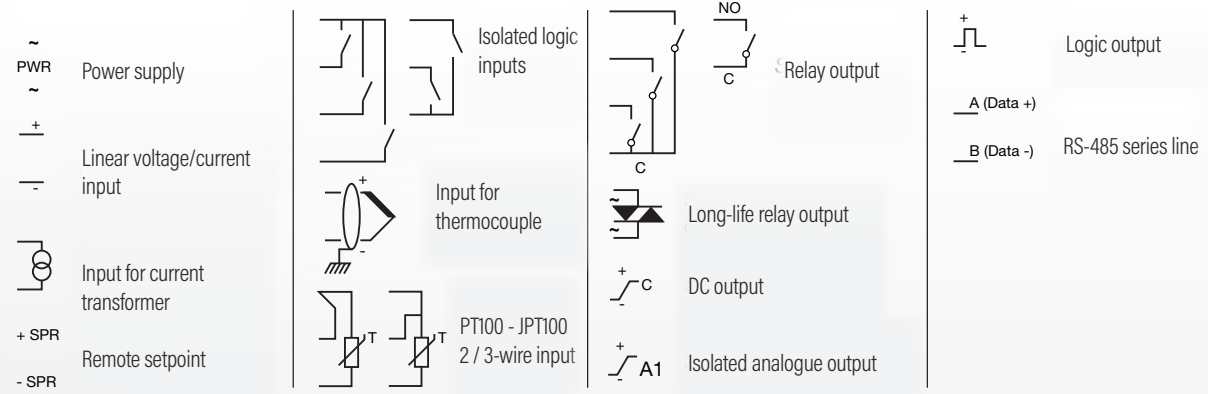
STATOP 696



INPUT / OUTPUT SPECIFICATIONS

STATOP 696

LEGEND



TO ORDER

STATOP 600 Series BI-LOOP PID controllers

Check out all the references in the 600 *ADVANCE* Series

- ✓ Models
- ✓ Inputs
- ✓ Outputs
- ✓ Functions
- ✓ Power supply
- ✓ Communication, etc.



STATOP 648 controllers



STATOP 689 controllers



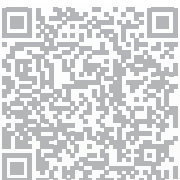
STATOP 696 controllers



& discover our single-loop controllers STATOP 500 SMART Series

on our website:

- ✓ www.pyrocontrole.com



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