

VIPA FM355 / R355

4/8-Channel Controller Module for Siemens S7-300, VIPA System 300V/S* and Decentral Peripheries

 3-349-327-03
 11/10.09

- System compatible with Siemens S7-300 and VIPA System 300V/S
- Software tool for complete configuration and parameter settings
- R355 Remote, startup, servicing and remote maintenance tool
- Sampling cycle 10 ms per channel
- 4/8 freely configurable control channels
- Binary inputs/outputs with short-circuit detection, freely assignable to controller states, functions and channels (depending upon variant)
- Non-assigned I/Os are freely available to the CPU
- Control parameters adaptation can be started at any time for each channel
- Control functions: limit transducer / 2-step, 3-step, continuous action and step-action controller
- Ratio, cascade, differential and switch control
- Hot runner control with actuating circuit and booster circuit
- Assignment to groups for control zones for synchronous heating
- Algorithms for water cooling
- Data logger for all actual values and setpoints
- Alarm history with time stamp
- Power limiting
- Billing of several measuring inputs to determine the controlled variable



QUALITY MANAGEMENT SYSTEM


 DQS certified per
 DIN EN ISO 9001 Reg. No.1262


New
Power Limiting

* 300S . . . System SPEED7 by VIPA

Features

- 4/8 sensor inputs, thermocouples, Pt100 or direct current and direct voltage can be selected individually with the software
- Thermocouple inputs immune to leakage current (up to 230 V)
- Removable cold junction, available as accessory equipment
- Suitable for zones with temperature rises of approximately 100 K/s to less than 100 K/h
- Mapping for checking sensor-actuator assignments
- Monitoring for sensor failure, reversed polarity and short-circuiting
- Plausible regulated temperature becomes active in the event of sensor failure
- All zones can be deactivated as desired with internal or external signal or manual operation possible
- Setpoint ramps (up-down), proxy setpoint, setpoint limiting
- Heating circuit monitoring without additional transformer
- Heating current monitoring with single/3-phase external current transformers and an optional voltage transformer for compensation of voltage fluctuation
- Numerous monitoring functions including, amongst others, channel and device-specific alarms, read-back outputs
- 2nd set of parameters
- Short-circuit detection at the binary outputs
- RS-232 service interface
- Standard continuous outputs (4-channel version: 2 continuous outputs / 8-channel version: 4 continuous outputs)

Filter und Functions with Distorted Controlled Variable

Designation / Parameter	Function	Limitation
Peak filter	Individual erroneous measurements caused by, for example, electrostatic discharge to the sensor, are suppressed.	---
Smoothing filter	In accordance with controlled system dynamics, several measured values are combined for control purposes in order to avoid an unsteady controlled variable.	---
Actual value correction, actual value factor	Linear correction of measured values, if, amongst other factors, measured temperature deviates from the temperature to be measured / to be displayed due to a temperature gradient.	---
Adaptive measured value correction	Suppression of constant periodic, or slowly changing oscillation.	Not active if period is longer than $\frac{1}{2} T_u^*$
Oscillation disabling (oscillation period: 0.3 to 20 s)	Suppression of oscillation with a constant period, if the period is longer than $\frac{1}{2} T_u$.	---
Feedforward control	Suppression of controlled variable swells and dips in the event of load fluctuations, e.g. caused by operation/standstill of a machine/system	Load fluctuation interval much greater than T_u^*
Response to sensor error, sensor error manipulating factor	If operation must be continued with a defective sensor, the controller reads out a plausible manipulated variable in order to maintain the working level.	---

 * T_u = delay time

Detailed information is included in the operating instructions.

VIPA FM355 / R355

4/8-Channel Controller Module

Description

The autonomous VIPA FM355 / R355 temperature controllers can be very quickly configured, and can be adapted to control systems by means of self-tuning. Outstanding control performance is achieved by means of GOSSEN METRAWATT's own dead-beat PDPI algorithm. Thanks to a well thought-out range of variants, for example with or without actuator output, trouble-free use is also possible over considerable distances. In addition to the standardized functions, the following have been integrated as well: a data logger for all actual values and setpoints, an alarm history for error status entries with time stamp, and mapping (a test tool which checks for correct heater and sensor wiring). A booster circuit, synchronous heating via all controller modules, and heating current monitoring with only a single summation current transformer via up to 24 control channels have been included as well for use with hot-runner tools.

Applicable Regulations and Standards

IEC 61010-1 / EN 61010-1 / VDE 0411, part 1	Safety requirements for electrical equipment for measurement, control and laboratory use
IEC 60529 / EN 60529 DIN VDE 0470 part 1	Protection provided by enclosures for electrical equipment (IP code)
DIN EN 60204-1 / VDE 0113, Part 1	Machine safety
DIN EN 61326 VDE 0843, part 20	Electrical equipment for measurement, control and laboratory use – EMC requirements
IEC 60584 / EN 60584 (DIN 43710)	Thermocouples
IEC 60751 / DIN EN 60751	Industrial platinum resistance thermometers and platinum resistance elements, Pt100 sensors
CSA approval	in preparation

Connector Pin Assignments

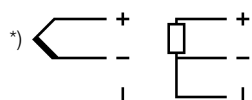
4-Channel Controller

Depending upon variant:

- Measurement inputs: thermocouple/Pt100 or direct voltage/current
- With or without actuator outputs (binary I/Os)

Front Plug Pin Assignments, 4 Thermocouples / Pt100 Sensors

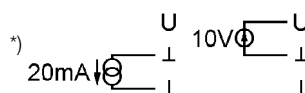
For connection of	1	L+	21	For connection of
				24 V DC supply power
1 A heating current transformer Phase 1	2 1k	2k	22	1 A heating current transformer Phase 2
1 A heating current transformer Phase 3	3 1l	2l	23	Heating voltage transformer (transformer, approx. 30 V)
Temperature sensor Channel 1 ^{*)}	4 3k	u	24	Temperature sensor Channel 2 ^{*)}
Z355 reference junction	5 3l	v	25	Temperature Sensor Channel 4 ^{*)}
Temperature Sensor Channel 3 ^{*)}	6 +	+	26	Digital input / output 1 ^{**)}
Analog output 1 (+10V/+20mA)	7 -1	2-	27	Digital input / output 2 ^{**)}
Analog output 2 (+10V/+20mA)	8 ⊥	⊥	28	Digital input / output 3 ^{**)}
Analog output ground (M)	9 C1	+	29	Digital input / output 4 ^{**)}
RS 232 service interface (pin 3)	10 C2	4-	30	Digital input / output 5 ^{**)}
				Digital input / output 6 ^{**)}
	11 +	⊥	31	Digital input / output 7 ^{**)}
	12 -3	l01	32	Digital input / output 8 ^{**)}
	13 ⊥	l02	33	Power supply ground
	14 AO1	l03	34	
	15 AO2	l04	35	
	16 AGND	l05	36	
	17 Rx	l06	37	
	18 Tx	l07	38	
	19 GND	l08	39	
	20	M	40	



^{**)} only for variant with binary I/Os

Front Plug Pin Assignments 4 ea. 10 V / 20 mA

For connection of	1	L+	21	For connection of
				24 V DC supply power
1 A heating current transformer Phase 1	2 1k	2k	22	1 A heating current transformer Phase 2
1 A heating current transformer Phase 3	3 1l	2l	23	Heating voltage transformer (transformer, approx. 30 V)
+ 0 ... 10 V Controlled variable, channel 1 ^{*)}	4 3k	u	24	Temperature sensor Channel 2 ^{*)}
+0/4 ... 20 mA	5 3l	v	25	Temperature Sensor Channel 4 ^{*)}
+ 0 ... 10 V Controlled variable, channel 3 ^{*)}	6 U	U	26	Digital input / output 1 ^{**)}
+0/4 ... 20 mA	7 ⊥ 1	2 ⊥	27	Digital input / output 2 ^{**)}
Analog output 1 (+10 V/+20 mA)	8 l	l	28	Digital input / output 3 ^{**)}
Analog output 2 (+10 V/+20 mA)	9	U	29	Digital input / output 4 ^{**)}
Analog output ground (M)	10	4 ⊥	30	Digital input / output 5 ^{**)}
RS232 service interface (pin 3)				Digital input / output 6 ^{**)}
	11 U	l	31	Digital input / output 7 ^{**)}
	12 ⊥ 3	l01	32	Digital input / output 8 ^{**)}
	13 l	l02	33	Power supply ground
	14 AO1	l03	34	
	15 AO2	l04	35	
	16 AGND	l05	36	
	17 Rx	l06	37	
	18 Tx	l07	38	
	19 GND	l08	39	
	20	M	40	



^{**)} only in variant with binary I/Os

VIPA FM355 / R355

4/8-Channel Controller Module

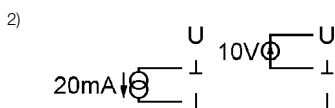
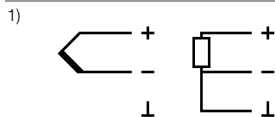
8-Channel Controller

Depending upon variant:

- Measurement inputs: thermocouple/Pt100 or direct voltage/current
- With or without actuator outputs (binary I/Os)

Pin Assignments, Left Front Plug, AI, 8 ea. Thermocouple

For connection of	1	L+	21	For connection of
24V DC supply power				24V DC supply power
1 A heating current transformer Phase 1	2 1k	2k	22	1A heating current transf. Phase 2
1 A heating current transformer Phase 3	3 1l	2l	23	Heating voltage transformer (transformer, approx. 30 V)
	4 3k	u	24	
	5 3l	v	25	
	6		26	
Temperature Sensor Channel 1 ¹⁾	7 +	+	27	Temperature sensor Channel 2 ¹⁾
	8 -1	2 -	28	
	9 ⊥	⊥	29	
Z355 reference junction	10 C1	C2	30	
Temperature sensor Channel 3 ¹⁾	11 +	+	31	Temperature sensor Channel 4 ¹⁾
	12 -3	4 -	32	
	13 ⊥	⊥	33	
Temperature sensor Channel 5 ¹⁾	14 +	+	34	Temperature sensor Channel 6 ¹⁾
	15 -5	6 -	35	
	16 ⊥	⊥	36	
Temperature sensor Channel 7 ¹⁾	17 +	+	37	Temperature sensor Channel 8 ¹⁾
	18 -7	8 -	38	
	19 ⊥	⊥	39	
	20	M	40	Power supply ground



³⁾ is also required for supplying analog outputs and service interface

⁴⁾ only in variant with binary I/Os

Pin Assignments, Left Front Plug, AI, 8 ea. U/I

For connection of	1	L+	21	For connection of
24 V DC supply power				24 V DC supply power
1 A heating current transformer Phase 1	2 1k	2k	22	1A heating current transf. Phase 2
1 A heating current transformer Phase 3	3 1l	2l	23	Heating voltage transformer (transformer, approx. 30 V)
	4 3k	u	24	
	5 3l	v	25	
	6		26	
+ 0 ... 10 V Controlled variable, channel 1 ²⁾	7 U	U	27	+ 0 ... 10 V Controlled variable, channel 2 ²⁾
+ 0/4 ... 20 mA	8 ⊥ 1	2 ⊥	28	+ 0/4 ... 20 mA
	9 I	I	29	
	10		30	
				²⁾
+ 0 ... 10 V Controlled variable, channel 3 ²⁾	11 U	U	31	+ 0 ... 10 V Controlled variable, channel 4 ²⁾
+ 0/4 ... 20 mA	12 ⊥ 3	4 ⊥	32	+ 0/4 ... 20 mA
	13 I	I	33	
+ 0 ... 10 V Controlled variable, channel 5 ²⁾	14 U	U	34	+ 0 ... 10 V Controlled variable, channel 6 ²⁾
+ 0/4 ... 20 mA	15 ⊥ 5	6 ⊥	35	+ 0/4 ... 20 mA
	16 I	I	36	
+ 0 ... 10 V Controlled variable, channel 7 ²⁾	17 U	U	37	+ 0 ... 10 V Controlled variable, channel 8 ²⁾
+ 0/4 ... 20 mA	18 ⊥ 7	8 ⊥	38	+ 0/4 ... 20 mA
	19 I	I	39	
	20	M	40	Power supply ground

Pin Assignments, Right Front Plug, DIO, 24 ea. 24 V DC

For connection of	1	1L+	2L+	21	For connection of
Supply power, 24V, IO17...24 ⁴⁾					Supply power, 24V, IO1 ... 8 ⁴⁾
Digital input / output 17 ⁴⁾	2	IO17	IO1	22	Digital input / output 9 ⁴⁾
Digital input / output 18 ⁴⁾	3	IO18	IO2	23	Digital input / output 10 ⁴⁾
Digital input / output 19 ⁴⁾	4	IO19	IO3	24	Digital input / output 11 ⁴⁾
Digital input / output 20 ⁴⁾	5	IO20	IO4	25	Digital input / output 12 ⁴⁾
Digital input / output 21 ⁴⁾	6	IO21	IO5	26	Digital input / output 13 ⁴⁾
Digital input / output 22 ⁴⁾	7	IO22	IO6	27	Digital input / output 14 ⁴⁾
Digital input / output 23 ⁴⁾	8	IO23	IO7	28	Digital input / output 15 ⁴⁾
Digital input / output 24 ⁴⁾	9	IO24	IO8	29	Digital input / output 16 ⁴⁾
Power supply ground ⁴⁾	10	1M	2M	30	Power supply ground ⁴⁾
Analog output 1 (+10 V/+20 mA)	11		3L+	31	Supply power, 24 V, IO9 ... 16 ³⁾
Analog output 2 (+10 V/+20 mA)	12	AO1	IO09	32	Digital input / output 9 ⁴⁾
Analog output 3 (+10 V/+20 mA)	13	AO2	IO10	33	Digital input / output 10 ⁴⁾
Analog output 4 (+10 V/+20 mA)	14	AO3	IO11	34	Digital input / output 11 ⁴⁾
Analog output ground (3M)	15	AO4	IO12	35	Digital input / output 12 ⁴⁾
RS232 (pin 3)	16	AGND	IO13	36	Digital input / output 13 ⁴⁾
service (pin 2)	17	Rx	IO14	37	Digital input / output 14 ⁴⁾
interface (pin 5)	18	Tx	IO15	38	Digital input / output 15 ⁴⁾
	19	GND	IO16	39	Digital input / output 16 ⁴⁾
	20		3M	40	Power supply ground

VIPA FM355 / R355

4/8-Channel Controller Module

Characteristic Values

Inputs / Outputs

Sampling rate 10 ms per channel,
100 ms for all channels,
with integrated conversion for
suppression of 50/60 Hz including
harmonics up to the 13th harmonic

Measurement input: thermocouple / 50 mV linear

Thermocouples Per IEC 60584 / EN 60584 / DIN 43710
type J, L, K, R, S, B, N, C

Measuring range Linear, 0 to 50 mV

Nominal input range for type

J, L	0 ... 900° C
K	0 ... 1300° C
R, S	0 ... 1750° C
B	0 ... 1800° C
N	0 ... 1300° C
C	0 ... 2300° C

Accuracy / error < 0.7% of measuring range span for types
J, L, K and N
< 2.0% of measuring range span for types
R and S, as of 600° C for type B

Resolution 0.1 K

cont. overload AC: 50 / 60 Hz / 50 V AC, sinusoidal
DC: 1 V DC

Input impedance approx. 50 kΩ

Error message For sensor breakage or polarity reversal, or
temperature outside of measuring range

Reference Junction Measurement Input

Nominal input range 0 to 70° C

Accuracy ± 2 K

Reference junction removable, available as accessory equip-
ment

Pt100 Resistance Thermometer Measurement Input, 2 or 3-Wire Connection

Pt100 per IEC 60751 / DIN EN 60751

Measuring range 60 to 280 Ω

Nominal Input range -200 to 850° C

Sensor current < 0.2 mA

Offset compensation Possible by means of parameter entry

Accuracy / error < 0.5 % of measuring range

Resolution 0.1 K

Cont. overload AC: 50 / 60 Hz / 50 V AC, sinusoidal
DC: 1 V DC

Input impedance approx. 18 kΩ

Cable resistance (both directions) 2-wire connection: 0 to 30 Ω, adjustable
3-wire connection: 0 to 30 Ω, compensated

Error message For sensor breakage or short-circuit, or
temperature outside of measuring range

Sensor Input Configuration

Sensor type is selected separately for each input.

Measurement Input: Direct Voltage, Direct Current

	Direct voltage	Direct current
Measuring range	0 / 2 to 10 V, configurable	0 / 4 to 20 mA, configurable
Continuous overload	100 V	60 mA DC
Input impedance / load	approx. 84 kΩ	approx. 45 Ω
Error message	when measuring quantity exceeds or falls below measuring range by more than 10 %	
Accuracy	< 0.7 % of measuring range span	
Resolution	< 0.1 % of final value	

Heating Current Monitoring Input

Measuring range 1 A AC (direct connection of a commer-
cially available measuring transducer)

Resolution < 0.1% of upper range value

Accuracy typically < 5% of upper range limit

Reproducibility < 1% of measured value + 0.5% of upper range limit

Heating Voltage Monitoring Input

Measuring range 10 to 50 V AC (direct connection of a com-
mercially available measuring transducer)

Resolution < 0.1% of upper range value

Accuracy typically < 5% of upper range limit

Reproducibility < 1% of measured value + 0.5% of upper range limit

Binary Inputs and Outputs (depending upon variant)

Output function Active switching outputs supplied directly
from auxiliary voltage

Functions Switching output (heating/cooling or
more/less for step-action controllers)
alarm output
non-assigned I/Os are freely available to CPU

Read-out cycle Adjustable within a range of 0.1 to 300 s

Nominal range of use H signal: $U \geq$ auxiliary voltage $-0.5 V$
 $I \leq 100 mA$
L signal: < 0.1 mA
e.g. for controlling up to 3 commercially
available semiconductor relays (SSR) in
series

Input function Read back output status,
external control of PLC etc.
non-assigned I/Os are freely available to CPU

Nominal range of use H signal: > 14 V / 8 ... 16 mA at 24 V
L signal: < 7 V / < 0.2 mA

Overload limit H and L signals Continuous short-circuit, interruption

Continuous Outputs

Output function Actuator output for proportional actuator

Output quantity 0 (2) ... 10 V at > 1 kΩ load,
0 (4) ... 20 mA at < 300 Ω load

Resolution 0.1% of upper range value

Accuracy < 3% of upper range limit

Status indicators (depending upon variant)

Power on (L+)	green
Run	green
Controller active (loop)	green
Error	red
Binary I/Os active	green

VIPA FM355 / R355

4/8-Channel Controller Module

Control Performance

Setpoints

Setpoint limiting	Adjustable upper and lower setting limits
Setpoint 2	Activated via binary input or bus, adjustable value
Setpoint increase (boost)	Activated via binary input or bus, value and maximum duration can be configured
Ramp Function (separate for rise and fall)	Specification of gradual temperature change in degrees/min. Activated by means of: <ul style="list-style-type: none"> – Turn on auxiliary voltage – Change current setpoint value – Activate proxy setpoint – Switch from manual to automatic operation

Configurable Control Modes

Unused	No error monitoring
Measure	With limit value monitoring
Actuator	
Limit transducer	Two / three-step controller without time response
PDPI controller	Heating Cooling Can be combined as desired
	Switching Switching
	Hot-runner Water cooling
	Continuous Continuous
	Step Step
	No heating No cooling
Proportional actuator	Two / three-step controller without time response

Control Channel Combinations

Differential contr.	The temperature difference is corrected.
Cascade contr.	The setpoint from one or more control channels is manipulated dynamically.
Switch controller	Depending upon operating state, a control loop with only one actuator can be controlled at two different (temperature) measuring points.
Ratio controller	Two controlled variables are controlled at a ratio determined by a setpoint. To this end, the command variable is obtained from the product of the setpoint value in a thousandth and the actual value of the partner channel. An activated setpoint ramp influences the command variable. The controller type of the partner channel can be chosen independently, e.g. fixed-value control.

Self-Tuning

Can be started at any time from any operating state.
Control parameters can be changed.

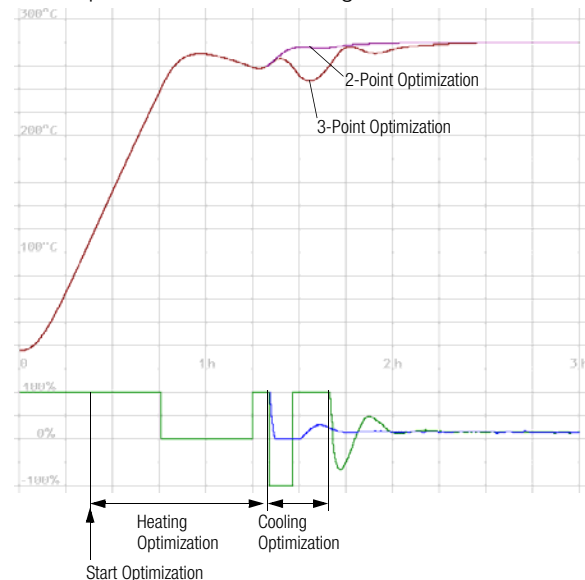


Figure 1 Control Performance with Self-Optimization

Alarms

All errors and alarms for all channels, I/Os and functions can be accessed separately.

Selected errors and alarms can be read out to the binary outputs. Selection and assignment to a specific output can be configured as desired.

Channel-Specific Alarms

- Broken sensor, reversed polarity
- Two upper and two lower limit values, relative and absolute
- Heating current / heating circuit errors
- Adaptation errors

Device-Specific Alarms

- Hardware errors
- Overloading of the measurement inputs
- Reference junction errors
- I/O errors
- Mapping errors
- Parameter errors

Alarm History

The alarm history stores 100 error status entries with respective time stamps in a ring memory. Recording is started over each time the device is reset, and data are lost if auxiliary power fails.

Monitoring Functions

Limit Value Monitoring

Two upper and two lower limit values can be configured per channel.

Alarm memory and actuation suppression can be set up.

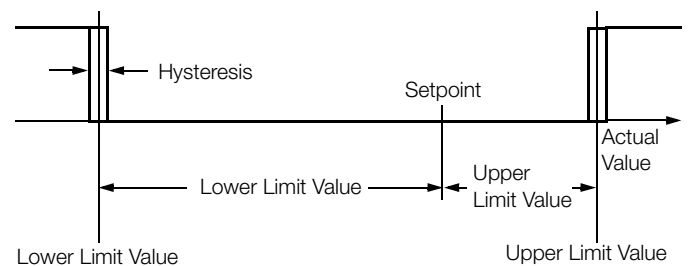


Figure 2 Schematic Representation of Relative Limit Value Monitoring

VIPA FM355 / R355

4/8-Channel Controller Module

Heating Current Monitoring

Heating current monitoring Permanently installed

Heating current acquisition With external, commercially available current transformer. Measurement of summation current for all 8 channels. Measurement of summation current for up to 24 channels is possible with a transformer

Nominal value transfer Initiated automatically via the bus

Compensation of current fluctuation By measuring heating voltage

Error Messages for	
- Antivalence	Actuator signal OFF + heating current ON Actuator signal ON + heating current OFF
- Actual current value less than nominal value	Dip below nominal heating current value by more than 5% + 0.1 A with actuator signal ON

Heating Circuit Monitoring

Without external transformer, without additional parameters

Configurable Heating circuit monitoring active / inactive

Error Messages for 100% heat without rising temperature, i.e. for short-circuited thermocouple, interrupted heating, no sensor in heating circuit

Hot Runner Control Functions

Actuating Circuit

Actuation with a reduced manipulating factor and dwelling at a specific actuation setpoint serves to dry out hygroscopic heating elements.

Group Actual Value Control – Synchronous Heating

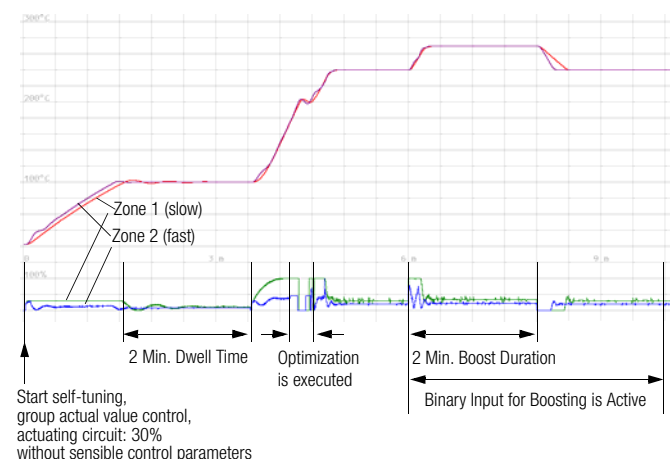
Synchronous heat-up prevents thermal stress by minimizing actual value differences.

If self-tuning has been started, it takes actual value management into consideration, as well as the actuating circuit.

Synchronous heat-up via several controller modules is also possible.

Boosting – Temporarily Increased Setpoint

Temporarily increasing the setpoint frees clogged mould nozzles of “frozen” material remnants.



Mapping for Checking Sensor and Heater Assignments

This function is used to test for correct wiring of the heater and the sensors. Assignments can be checked when the machine is started up before initial heat-up. Testing is conducted in several phases in order to determine whether or not the temperature changes at the individual channels coincide with the actuating signals. If an error is detected, all actuating outputs remain inactive until the error has been acknowledged.

Data Logger

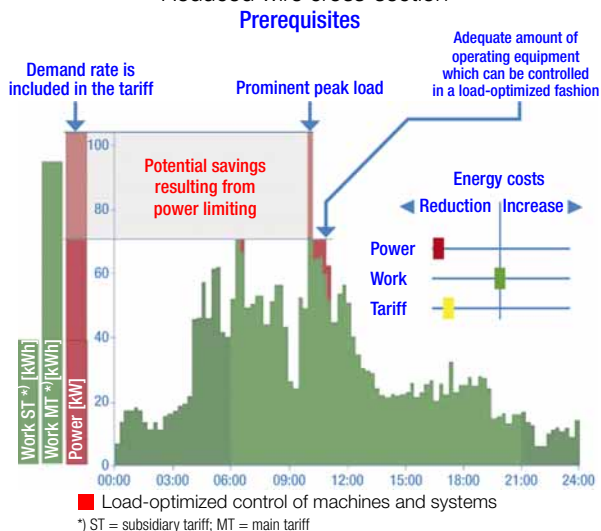
The data logger stores 3600 sampled value pairs including actual values and manipulated variables for all 4/8 channels in a ring memory. Recording duration can be set between 6 minutes and 12 days. Recording is started over each time the device is reset, and data are lost if auxiliary power fails.

Power Limiting

With this function it is possible to prevent peaks in the power consumption of the heaters and/or to limit the total current consumption.

The positioning output of the heaters of all 4/8 channels is synchronized and the heaters are activated in a staggered pattern to ensure that only a minimum number of heaters are active at the same time.

- Advantages:
- Cost savings thanks to energy optimization
 - Current consumption limited by collector rings
 - Reduced wire cross-section



Settings

- 0% function inactive, power peaks possible in regular operating mode
- 100% Avoidance of power peaks, actuation at full throttle; Advantage: This function is also active when power limiting has been set to 100% so that all 4/8 channels produce full heat during actuation. However, current loading is more evenly spread at the operating point, thus avoiding power peaks.
- X% Current limiting, a maximum number of 1 to 7 heaters of a total of 8 is simultaneously activated, i.e. avoidance of power peaks during regular operation; power is limited during actuation.

VIPA FM355 / R355

4/8-Channel Controller Module

Supply power L+

A fully isolated safety power supply must be used to operate the device.

Nominal value	24 V DC
Nominal range of use	18 ... 30 V DC
Power consumption	maximum 10 Watt, typically 6 W (without load)

Reference Conditions

Reference Quantity	Reference Condition
Auxiliary voltage	24 V DC \pm 1 V
Superimposed alternating voltage	Sinusoidal, or sinusoidal half-waves: 0.1 V AC
Allowable common-mode voltage	To electrically connected inputs: 0 V DC / AC
Ambient temperature	23° C \pm 2 K
Reference junction temperature	23° C \pm 2 K
Warm-up time	3 minutes
Measurement inputs	Thermocouple, low-resistance termination: \leq 10 Ω Pt100: 110 \pm 10 Ω

Influencing Quantities and Influence Error

Influencing Quantity	Nominal Range of Use	Maximum Influence Error
Ambient temperature		
– Thermocouple / Pt100	0° C ... + 50° C	\pm 0.05% MRS ¹⁾ / K
– Reference junction	0° C ... + 50° C	0.1 K / K
Cable resistance		
– Thermocouple	RL = 0 ... 200 Ω	\pm 0.1% MRS ¹⁾ / 10 Ω
– Pt100, 2-wire	RL = 0 ... 30 Ω	Approx. 3 K / Ω
– Pt100, 3-wire	RL = 0 ... 30 Ω	(adjustable) \pm 2 K / 10 Ω
Warm-up influence	\leq 3 min	\pm 1%

¹⁾ MRS = measuring range span

Electrical Safety

Variant	IEC 61010-1 / EN 61010-1 / VDE 0411, part 1
Safety class	II
Overvoltage category	CAT I
Fouling factor	2
Protection	IEC 60529 / EN 60529 / VDE 0470, part 1
Housing	IP 20
Terminals	IP 20

Attention: The device is not equipped with its own mains switch.

Electromagnetic Compatibility

Interference Emission		IEC 61326/EN 61326		
Interference Immunity		IEC 61326/EN 61326		
Test type	Standard	Test severity		Criterion
ESD	EN 61000-4-2	4 kV	Contact discharge	A
		8 kV	Atmospheric discharge	A
E field	EN 61000-4-3	10 V / m	80 ... 1000 MHz	A
Burst	EN 61000-4-4	2 kV	At all connector cables	A
Surge	EN 61000-4-5	1 kV	Asymmetrical	A
HF	EN 61000-4-6	3 V	0.15 ... 80 MHz, all terminals	A
NF	EN 61000-4-8	30 A/m	Magnetic field at system frequency	A
			Voltage dip	A

Ambient Conditions

Annual mean relative humidity, no condensation	5 to 95%
Ambient temperature	
– Nominal Range of Use	0° C ... + 60° C
– Operating range	0° C ... + 60° C
– Storage range	– 25° C ... + 70° C

Mechanical Design

Basic housing dimensions:

Single width (W x H x D) in mm: 40 x 125 x 120

Double width (W x H x D) in mm: 80 x 125 x 120

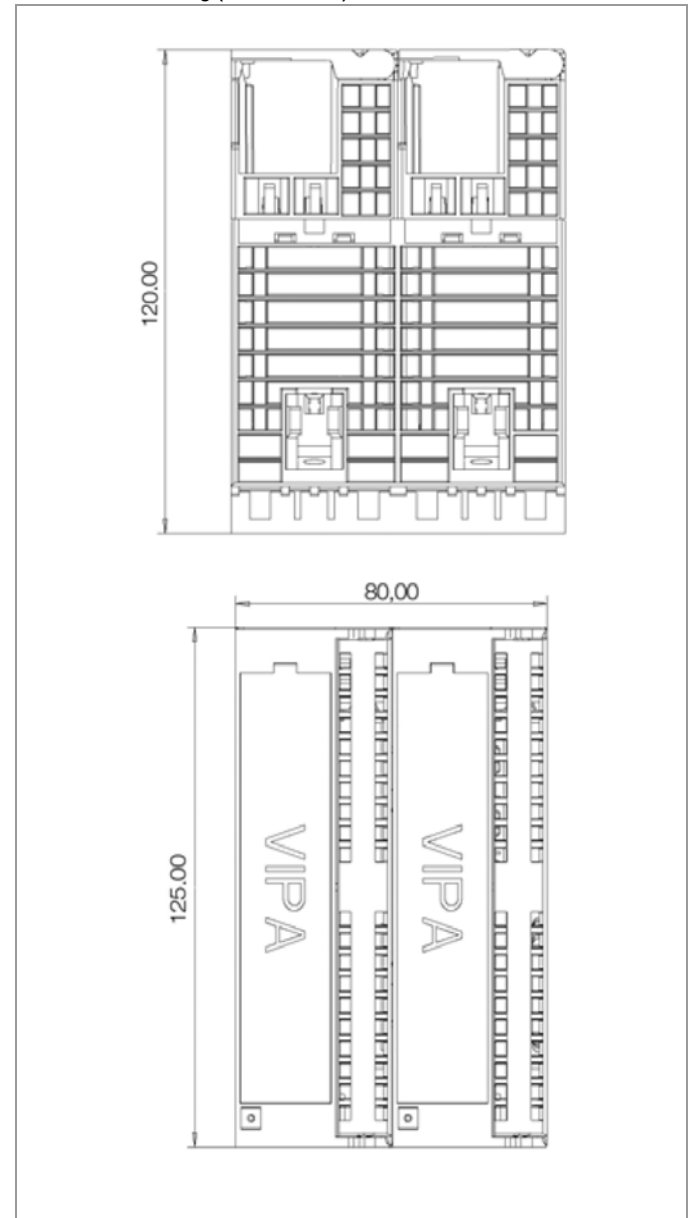
Weight 4-channel module: approx. 250 g

8-channel module: approx. 500 g

Type of connection 40-pin front plug

Mounting Mounting rail on System 300

Dimensional Drawing (double width)



VIPA FM355 / R355

4/8-Channel Controller Module

Service

Controller modules with parameter sets can be readily replaced if service is required:

- Storage of the parameter set in the CPU
- Comparison of the parameter set ID during start-up and parameter set updating

Service Interface

A laptop or a notebook can be connected to the RS 232 interface for service purposes, and for configuration.

Type	Service Interface
Interface	RS 232
Maximum number of devices	1
Transmission Speed	19.2 kBaud
Protocol per	EN 60870

Order Information

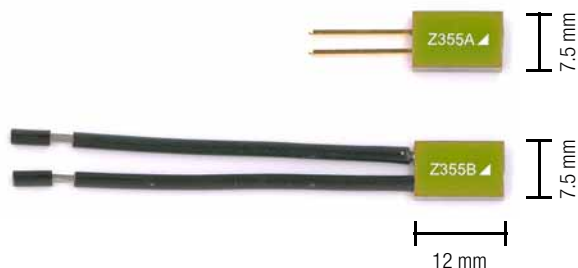
4-Channel Temperature Control Module		
Article Number	Measurement Inputs	Binary I/Os
VIPA FM355-3SD00 / R355A	Current / voltage	None
VIPA FM355-3SD10 / R355B	Thermocouple / Pt100	None
VIPA FM355-4SD00 / R355E	Current / voltage	8
VIPA FM355-4SD10 / R355F	Thermocouple / Pt100	8

8-Channel Temperature Control Module		
Article Number	Measurement Inputs	Binary I/Os
VIPA FM355-3SF00 / R355C	Current / voltage	None
VIPA FM355-3SF10 / R355D	Thermocouple / Pt100	None
VIPA FM355-4SF00 / R355G	Current / voltage	24
VIPA FM355-4SF10 / R355H	Thermocouple / Pt100	24

Accessories

Description	Article Number
Removable cold junction suitable for front plug with screw connection	Z355A
Removable cold junction suitable for front plugs with screw connection or spring terminals	Z355B
355 Remote Startup, servicing and remote maintenance tool	Z355C

Removable Cold Junctions

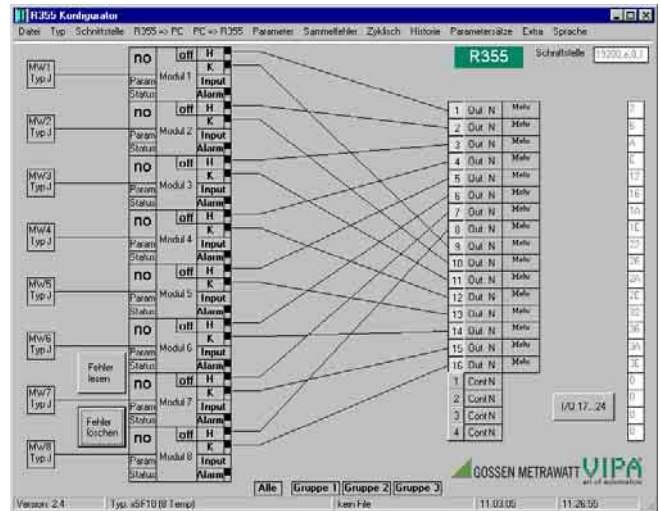


VIPA FM355 / R355 4/8-Channel Controller Module

355Config Configuration and Parameter Setting Tool

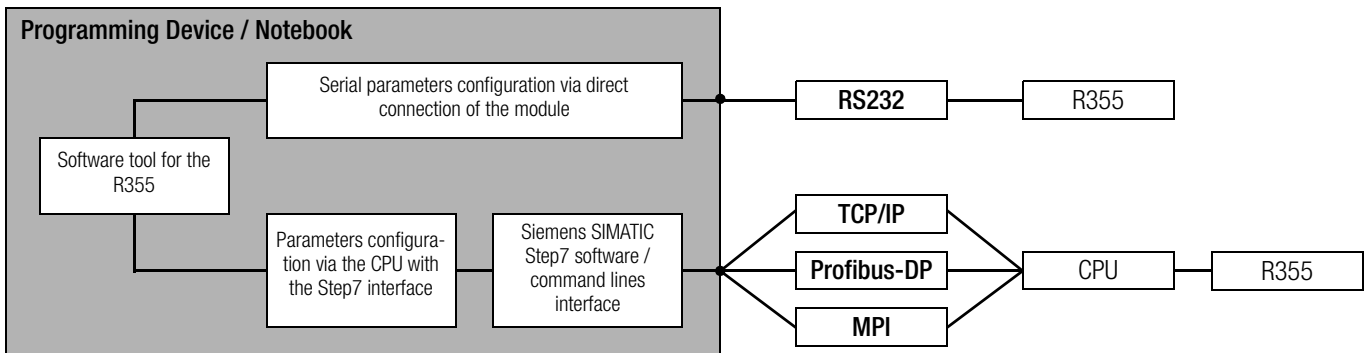
The 355Config software tool allows for complete configuration and parameter setting of the controller module.

All values are uploaded and downloaded via a serial port (COM or USB). Cyclically occurring values such as actual values, manipulated values, heating current and alarms can be observed online.



355 Remote – Initial Start-Up, Service and Remote Maintenance Tool

This software tool provides complete functions for all aspects of the R355 controller module. Thanks to direct access to the command line interface included with SIMATIC Step7, bus connections are of minor importance only..

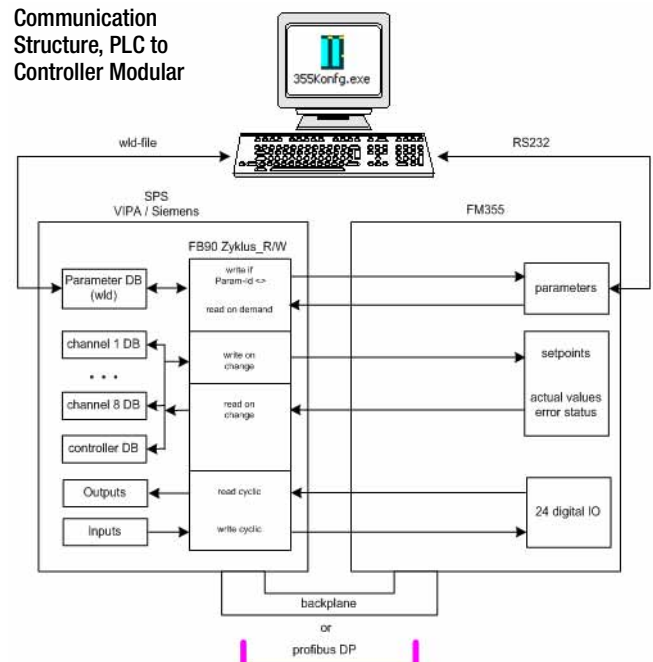


Data Handling Blocks

Data handling blocks are used for central communication between the user program and the controller module.

Demo blocks are available on the Internet and can be downloaded free of charge.

Communication Structure, PLC to Controller Modular



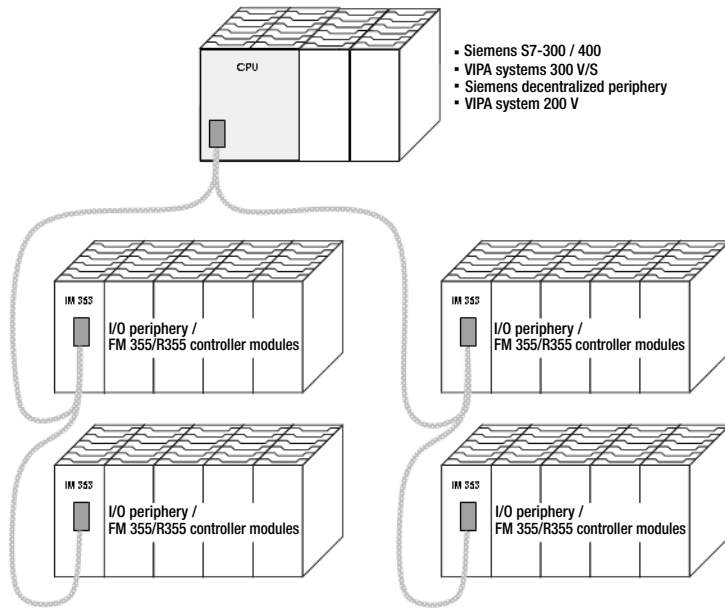
VIPA FM355 / R355

4/8-Channel Controller Module

Connecting the VIPA FM355/R355 to Decentralized Siemens Peripheries, as well as the Siemens S7-400 and VIPA's System 200V

Decentralized peripheries are gaining more and more significance. Periphery devices which are operated on-site communicate with a central control CPU via Profibus-DP. The VIPA IM 353DP (Profibus-DP slave) allows for operation of the controller modules at decentralized Siemens peripheries, as well as at the Siemens S7-400 or VIPA's System 200V.

Overview



Technical characteristics of the VIPA IM 353DP

- Profibus-DP slave, 9.6 kBaud to 12 MBaud
- Profibus-DP slave for max. 32 periphery modules (max. 16 analog modules)
- Max. 152 bytes input data and 152 bytes output data
- LEDs for bus diagnosis
- Internal diagnosis report with time stamp
- Integrated 24 V DC power pack for supplying power to periphery modules (max. 3.5 A)



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