



Invensys Controls Italy S.r.l.

CONTROLLI Division

certified ISO9002

LITERATURE

Controlli has available for its customers the following literature:

- Data Sheets** specify manufacturing and technical characteristics of the products and their application, installation, wiring connections and start-up instructions.
- Catalogue** illustrates synthetically Controlli's products range depending on different application type.
- Maintenance Instructions** provide the information for the correct use of the equipment and for its maintenance.
- Advertising Bulletins** advertise single Controlli products or control systems.
- Application Diagrams** illustrate the most common applications, indicating the equipment of control system, basic system and wiring diagram.
- Control Valves** supply the necessary information for the right selection, sizing and use of control valves.
- Price List** lists the prices and sales conditions.
- Spare Parts Price List** illustrates and lists the spare parts of products with relevant prices.

SERVICES

Controlli offers customers the following services:

- Application Engineering Office** available for technical information, selection, application and quotations of equipment and complete control systems.
- Sales Service** consisting of our own technical staff and authorized assistants for technical guidance, commissioning, repairs and maintenance.
- Technical Training Courses** these are held periodically for both technical and commercial staff of our agents and customers, users, on equipment and control systems.

GROWING PRESENCE

CONTROLLI, in recent years, has obtained a significant presence and became a market leader in control systems for large and prestigious buildings.

Although the design of buildings, both architecturally and functionally, is in a constant state of evolution, CONTROLLI has the ability to provide the necessary level of comfort and energy saving through intelligent control for heating, ventilating and air-conditioning systems for industrial, commercial or residential applications.

EDITION 2002

SUMMARY

1- ELECTROMECHANICAL APPARATUS

200 LINE

On-Off / Floating Control

- 4 Room thermostats
- 4 Humidostats
- 4 Bulb and capillary thermostats
- 4 Fan-coil thermostat
- 4 Anti-frost thermostats
- 5 Immersion thermostats
- 5 Pressostats
- 5 Differential pressostats
- 5 Flow switches
- 5 Level controllers

300 LINE

Balance Potentiometer Propotional Control

- 7 Bulb and capillary thermostats
- 7 Pressostats
- 7 Level controllers
- 7 Remote potentiometer

2- SYSTEMS AND APPARATUS FOR HEATING PLANTS AND INDUSTRIAL PROCESSES

200 LINE

On-Off / Floating Control

- 9 Room thermostats
- 9 Day-night digital room thermostat
- 9 Temperature controllers

500 LINE

V d.c. Output Propotional Control

- 10 Temperature controllers

400 LINE

Time Propotional Control

- 11 Climatic controllers
- 12 Actuators for globe valves
- 12 Actuators for shoe and butterfly valves

DIGITROLL 4000

- 14 Microprocessor controller - optimizer for heating systems
- 14 Sequence boiler digital programmer

3- AIR-CONDITIONING SYSTEMS AND APPARATUS

500 Line

V. d.c. Output Propotional Control

- 17 Room thermostats
- 17 Temperature controllers
- 17 Anti-frost module
- 18 Temperature sensors
- 18 Humidity controllers
- 18 Enthalpy controller
- 18 Universal controllers
- 19 Differential pressure controllers
- 19 Air quality controller
- 19 On-Off action module
- 19 Selector modules
- 19 Power units
- 19 Electronic-pneumatic transducer module
- 20 Signal transducers
- 20 Remote set-point adjusters - Supply

4- FAN-COILS AND VAV UNITS SYSTEMS

700 Line

Analog Proportional and Microprocessor three points Control

- 22 Controllers
- 22 Auxiliary modules
- 22 Temperature sensors
- 22 Compensator modules

RT 220 Line

Fan-coil Valve and 3-Stage Fan Speed Controllers

- 23 Controllers and sensors

DIGITROLL 7000

Microprocessor Control

- 25 Control unit
- 25 Controllers
- 26 Sensors
- 27 Terminal units controllers cross reference

5- DDC SYSTEMS FOR HVAC

DIGITROLL 500

- 29 Controllers
- 30 Sensors and transmitters

DIGITROLL 2000

- 32 Controllers- I/O Module
- Display - Modem -Supervisors

6- FIELD DEVICES

Transmitters

- 34 Temperature transmitters
- 34 Humidity transmitters
- 34 Pressure and differential pressure transmitters
- 34 Room air quality transmitter

Actuators

- 35 Direct-mounting damper actuators
- 36 Crank-arm mounting damper actuators
- 37 Globe valves actuators

Motorized Valves

- 39 On-Off motorized valves

Globe Valves Bodies

- 40 Zone and fan-coil units valves
- 41 2-way single-seat
- 43 2-way balanced
- 43 2-way double-seat
- 44 3-way
- 46 Options and accessories
- 47 Butterfly valves

48 CONTROL VALVES SIZING

51 MODELS IN ALPHABETICAL ORDER

52 SALES AND SERVICE ORGANISATION

200 Line On-Off / Floating Control

GENERAL INFORMATION

Controllers

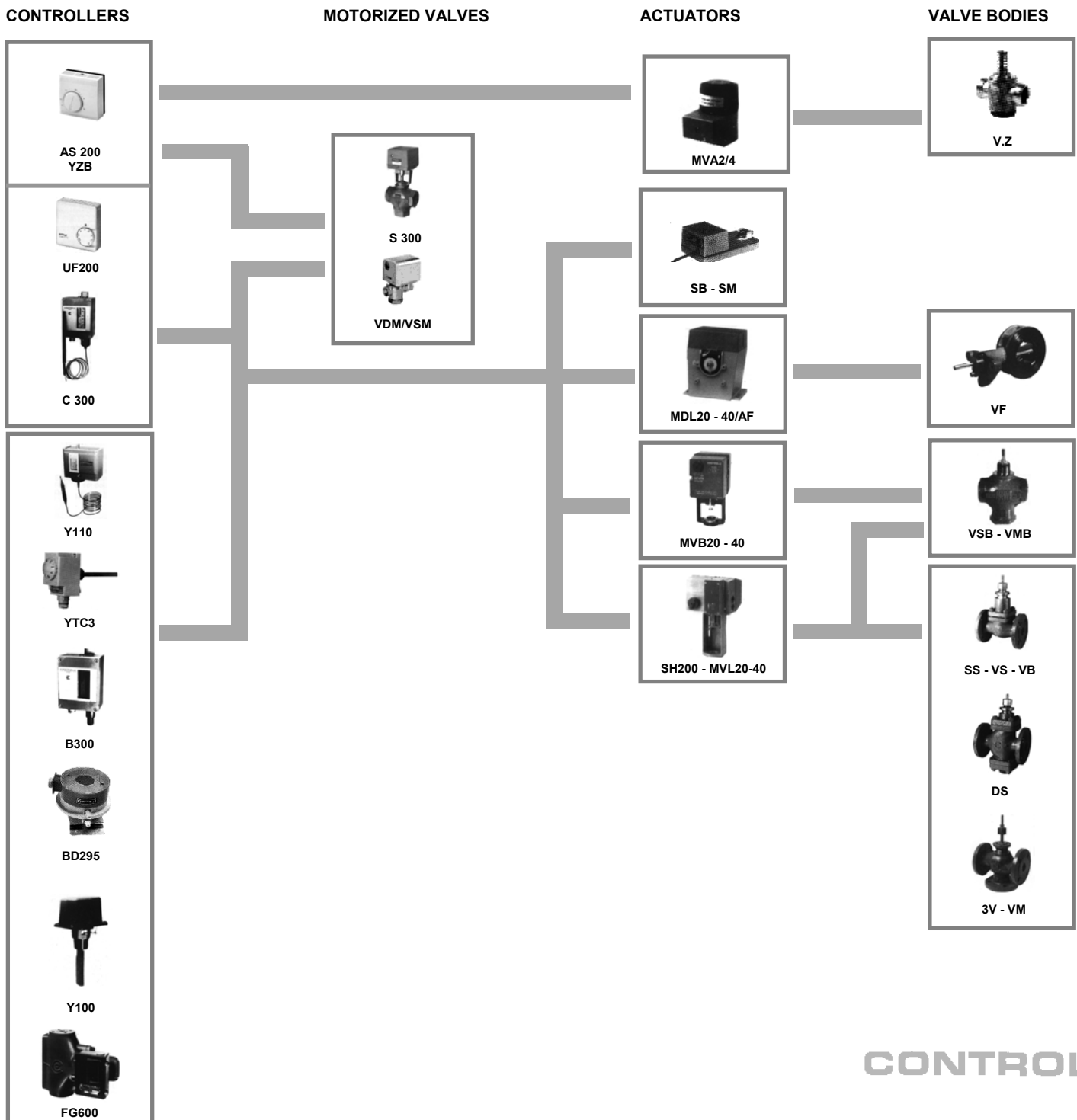
On-Off types are fitted with a snap-acting SPDT switch, floating types are fitted with an electric SPDT contact with dead zone.

Controlled devices

Controlled devices operated by On-Off controllers are relay, solenoid valves, motorized valves MVA2/4 - V.Z - S300, damper actuators SB and SMR.

Controlled devices operated by On-Off and floating controllers are damper actuators SB - SH200 - MDL20/40 and globe valves actuators MVB20 - SH200 - MVL20/40.

BASIC SYSTEM



ELECTROMECHANICAL APPARATUS

200 Line



Room thermostats

Series **AS200** - Bimetal thermal element.

MODEL	SCALE °C	DIFFERENTIAL K	OTHER CHARACTERISTICS
AS202A	5 to 30	1	SPDT 5 (2) A-240 V a.c.
AS204A	5 to 30	1	as above - with summer/winter change-over
AS203	10 to 30	1	as above with 3 speed



Humidostats

Series **UF200** - Sensitive synthetic fibre element - UF215 room type - UF216 duct type.

MODEL	SCALE % R.H.	DIFFERENTIAL % R.H.	OTHER CHARACTERISTICS
UF215	30 to 95	4	SPDT 5 (2) A-240 V a.c.
UF216	35 to 95	2	SPDT 1 5 (8) A-250 V a.c.



Bulb and capillary thermostats

Series **C300** - Vapor filled sensitive element - Differential 2.5 to 5 K - SPDT 15 (2.5) A-250 V a.c.
Die-cast aluminium case IP 55.

MODEL	SCALE °C	MAX SAFE TEMPERATURE °C	OTHER CHARACTERISTICS
C306	-10 to 40	50	copper bulb and capillary 2 m long
C307	20 to 70	85	
C308	55 to 120	135	
C309	95 to 140	155	
C310	135 to 200	230	
C306S	-10 to 40	50	copper spiral for ambient applications

Accessories for C300 thermostats.

G1	copper well 3/4" gas 180 mm long
G4	stainless steel well 3/4" gas 180 mm long
R1	brass gland nut 3/4" gas with packing



Fan-coil thermostat

Series **YZB** - Liquid filled sensitive element - Copper bulb and capillary 1 m long.
SPDT 15 (2.5) A-230 V a.c.

MODEL	SCALE °C	DIFFERENTIAL K	OTHER CHARACTERISTICS
YZB	0 to 40	2	setting knob and lock nut



Anti-frost thermostats

Series **Y110** - Vapor filled sensitive element - Copper bulb and capillary 1.8 m long.
SPDT 15 (8) A-230 V a.c.

Note - For a proper working, temperature to bulb must be lower than that one to controller.

MODEL	SCALE °C	DIFFERENTIAL K	OTHER CHARACTERISTICS
Y110	-10 to 12	1	max safe temperature 200 °C
Y110RM			as above with manual reset

Immersion thermostats

Series **YTC3** - Liquid filled sensitive element - SPDT 10 (2.5) A-250 V a.c.- IP 40

MODEL	SCALE °C	DIFFERENTIAL K	OTHER CHARACTERISTICS
YTC3	0 to 90	3	copper well gas ½" - 100 mm long
YTC3RM	90 to 110	-	as above with manual reset

Pressostats

Series **B300** - Sensitive metal bellows element - SPDT 15 (2.5) A-250 V a.c. - Die-cast aluminium case IP 55.

MODEL	SCALE kPa	DIFFERENTIAL kPa	MAX SAFE PRESSURE kPa	OTHER CHARACTERISTICS
B301	10 to 200	7 to 30	600	copper alloy bellows
B302	100 to 600	15 to 120	900	
B303	200 to 1400	60 to 400	2200	
B304	500 to 3000	80 to 400	3800	AISI 316 stainless steel bellows
B301X	10 to 200	7 to 30	600	
B302X	100 to 600	15 to 120	900	
B303X	200 to 1400	60 to 400	2200	
B304X	500 to 3000	80 to 400	3800	

Differential pressostats

Series **BD200** - Differential for signaling dirty air filter - Membrane sensitive element - SPDT 1 (0.5) A-230 V a.c.

MODEL	SCALE m bar	DIFFERENTIAL m bar	MAX SAFE PRESSURE m bar	OTHER CHARACTERISTICS
BD295	0.5 to 5	0.2	50	connections Ø 6 mm with PVC pipe air connections

Flow switches

Series **Y100** - Paddle type - SPDT 15 (8) A-230 V a.c.

MODEL	RANGE	OTHER CHARACTERISTICS
Y100	1 to 170 m³/h	for liquids - 1" screwed connections
Y101	1 to 5 m/s	for pipes Ø 1" to 8" for air - complete with mounting flange - paddle 175 x 80

Level controllers

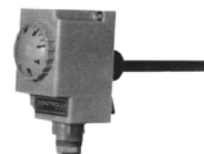
Series **FG600** - AISI 304 stainless steel float - Flanged connections - SPDT 10 (1) A-24 V a.c. - Industrial water-proof case.

MODEL	MAX WORKING PRESSURE kPa	DIFFERENTIAL mm	MAX WORKING TEMPERATURE °C	OTHER CHARACTERISTICS
FG601	1600	15 to 60	200	cast-iron body - connections 20 mm
FG603	3000	25 to 60	230	cast-steel body - connections 20 mm
FG604				as above with level sight glass

Auxiliary mercury bulb switch for FG600.

A1	SPST 5 (0.2) A-24 V a.c. - closed at minimum level
A2	as above, closed at maximum level
A3	as above, open at minimum level
A4	as above, open at maximum level

200 Line



ELECTROMECHANICAL APPARATUS

300 Line Balance Potentiometer Proportional Control

GENERAL INFORMATION

Controllers

They are linear potentiometer device type, with output signal 0 to 165 Ohm.

For each variation of controlled variable in the range of proportional band, the output signal changes proportionally and controlled device assumes the relevant position by the balance potentiometer

Controlled devices

The suitable controlled devices are bidirectional actuators fitted with electronic card and 300 Ohm balance potentiometer MDL30 for damper, MVB36 - MVL36 for globe valves.

BASIC SYSTEM

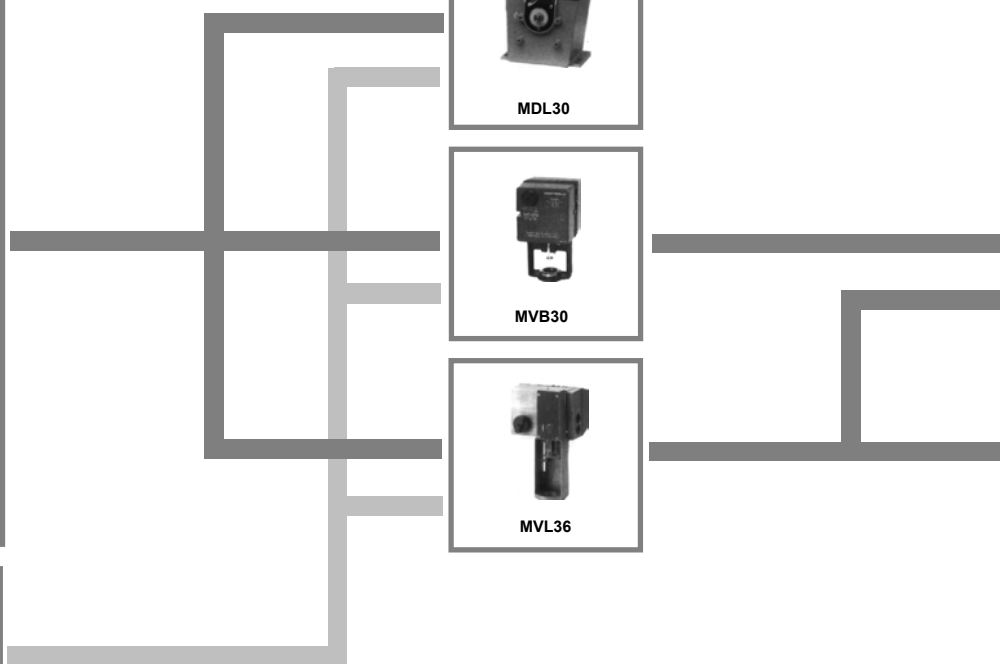
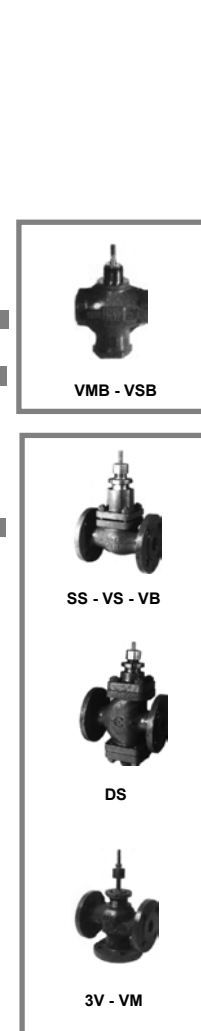
CONTROLLERS



ACTUATORS



VALVE BODIES



Bulb and capillary thermostats

Series **C350** - Vapor filled sensitive element - 165 Ohm potentiometer - Die-cast aluminium case IP 55.

MODEL	SCALE °C	PROPORTIONAL BAND K	MAX SAFE TEMPERATURE °C	OTHER CHARACTERISTICS
C356	-10 to 40	3 to 10	50	copper bulb and capillary 2 m long
C357	20 to 70		85	
C358	55 to 120		135	
C359	95 to 140		155	
C360	135 to 200	3 to 10	230	copper spiral for ambient applications
C356S	-10 to 40		50	

Accessories for C300.

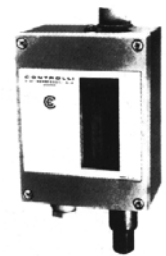
G1	copper well 3/4" gas - 180 mm long
G2	stainless steel well 3/4" gas - 180 mm long
G3	brass gland nut 3/4" gas with packing



Pressostats

Series **B350** - Sensitive metal bellows element - 165 Ohm potentiometer - Die-cast aluminium case IP 55.

MODEL	SCALE kPa	PROPORTIONAL BAND kPa	MAX SAFE PRESSURE kPa	OTHER CHARACTERISTICS
B351	10 to 200	25 to 100	600	copper alloy bellows
B352	100 to 600	35 to 350	900	
B353	200 to 1400	150 to 900	2200	
B354	500 to 3000	120 to 900	3800	
B351X	10 to 200	25 to 100	600	AISI 316 stainless steel bellows
B352X	100 to 600	35 to 350	900	
B353X	200 to 1400	150 to 900	2200	
B354X	500 to 3000	120 to 900	3800	



Level controllers

Series **FG650**-AISI 304 stainless steel float - Flanged connections - 165 Ohm potentiometer - industrial water-proof case.

MODEL	SCALE kPa	PROPORTIONAL BAND mm	MAX SAFE PRESSURE kPa	OTHER CHARACTERISTICS
FG651	1600	60	200	cast-iron body-connections 20 mm
FG653	3000	60	230	cast-steel body-connections 20 mm
FG654				as above with level sight glass



Auxiliary mercury bulb switch for FG650.

A1	SPST 5 (0.2) A-24 V a.c. - closed at minimum level
A2	as above, closed at maximum level
A3	as above, open at minimum level
A4	as above, open at maximum level

Remote potentiometer

Series **CM350** - Scale 0 to 10 - Potentiometer for remote control of 300 Line actuators: MDL30, page 33; MVB36, page 34; MVL36, page 35.

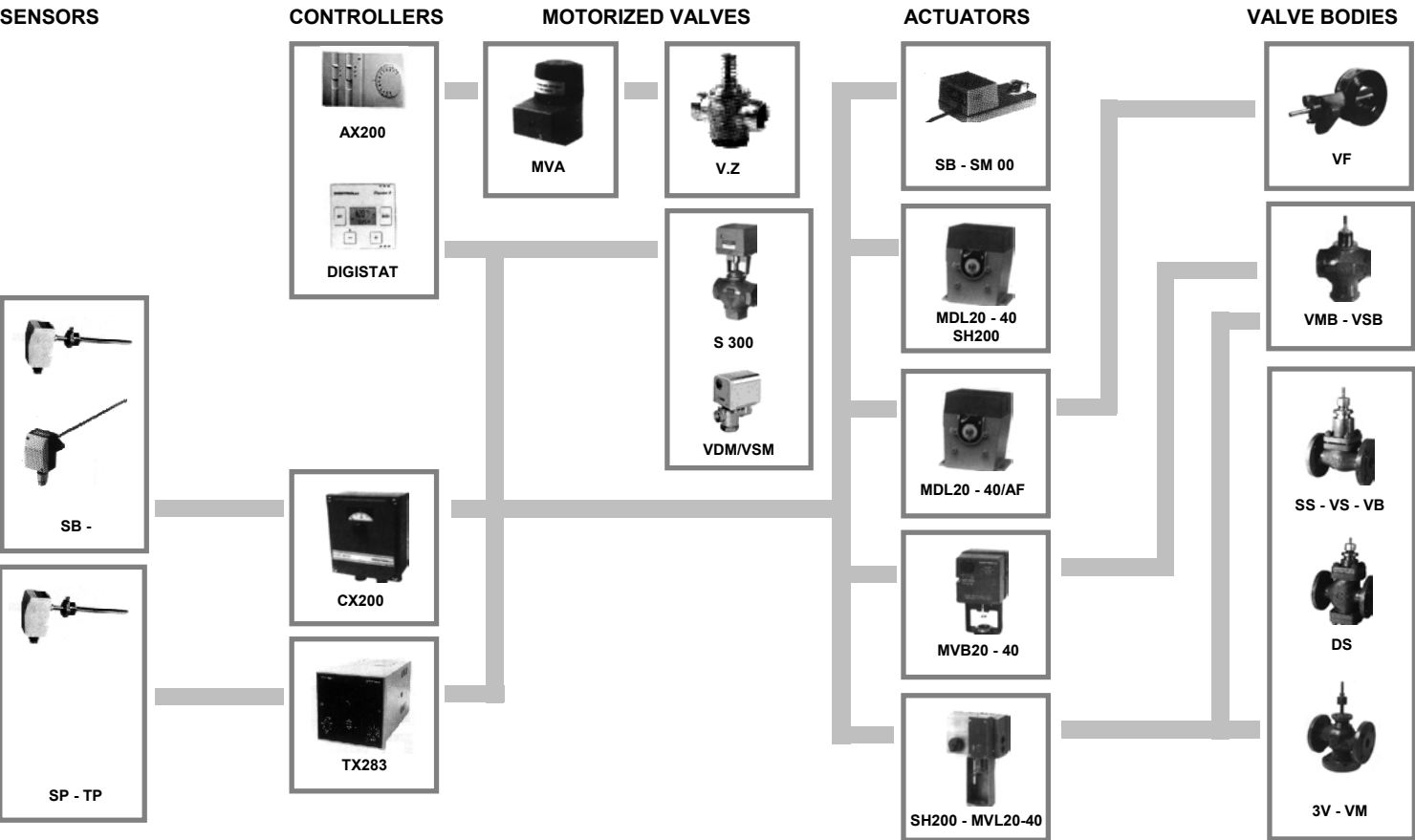
MODEL	OTHER CHARACTERISTICS
CM350	165 Ohm potentiometer - flush mounting



SYSTEMS AND APPARATUS FOR HEATING PLANTS AND INDUSTRIAL PROCESSES

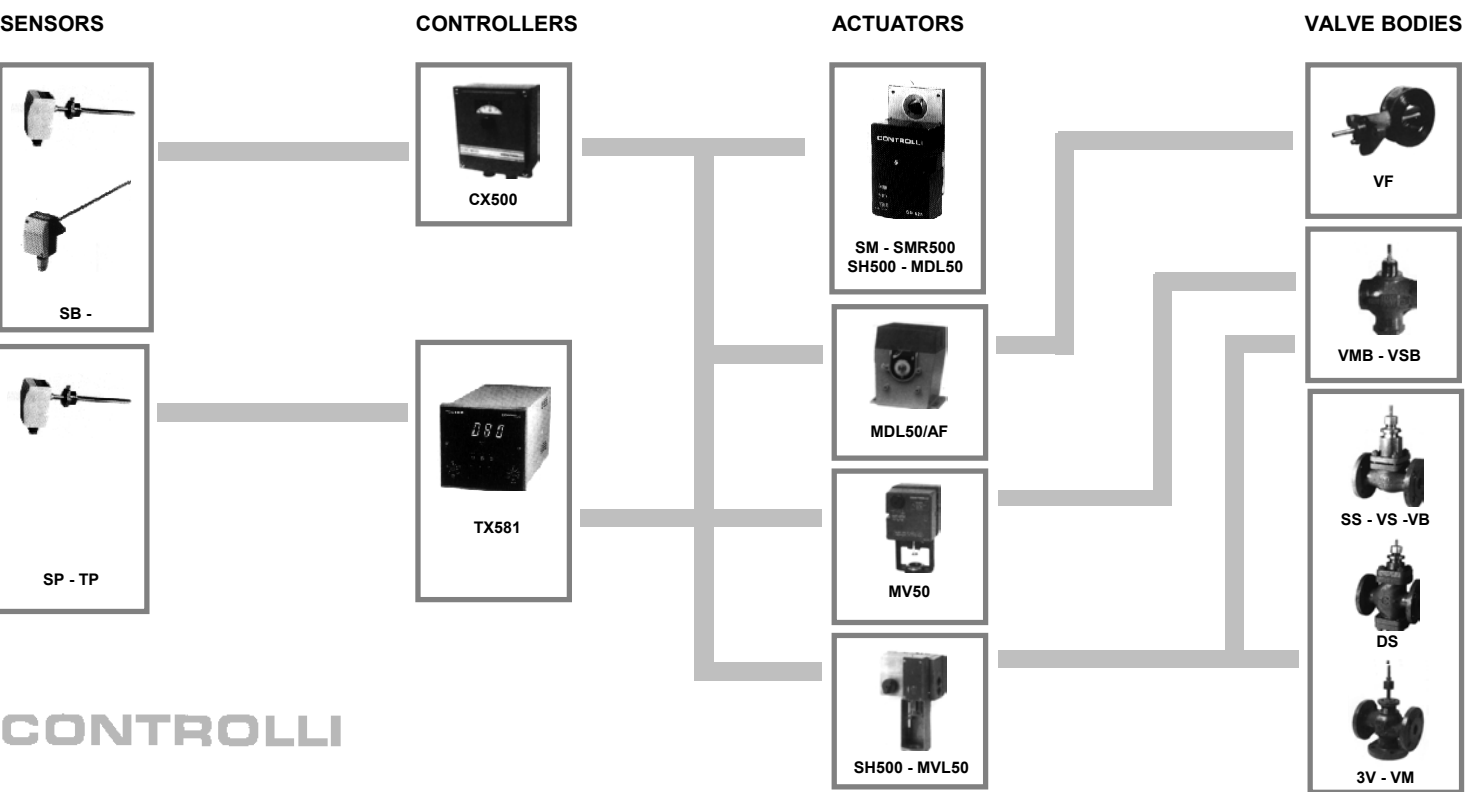
200 Line On-Off / Floating Control
(General Information see page 3)

BASIC SYSTEM



500 Line V d.c. Output Proportional Control
(General Information see page 15)

BASIC SYSTEM



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Room thermostats

Series **AX200** - Thermistor sensitive element - Supply 230 V a.c.

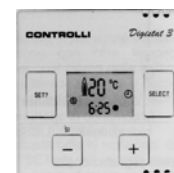
MODEL	RANGE °C	DIFFERENTIAL K	ELECTRICAL DEVICE
AX212A AX214A AX235	6 to 30	0.5	On-Off switch and 3-speed fan selector as above with summer/winter change over
	6 to 30	dead zone 0.5 to 6	2 stages SPDT 4 (0.5) A-230 V a.c.



Day/night- weeks room thermostats

Series **DIGISTAT** - Thermistor sensitive element.

MODEL	SCALE °C	DIFFERENTIAL K	OTHER CHARACTERISTICS
DIGISTAT 3	5 to 30	0.6	1 SPDT 2(1) A-240 V a.c. - supply by built-in battery 1,5 (2 wire connections)
DIGISTAT 3SF	5 to 30	0.6	Transmitter DIGISTAT RF3 (no electric connections) supply by built-in battery 4x1.5 V. Receiver DIGISTAT SCR: 1 SPDT 2 (1) A 240 V a.c. - Supply 240 V a.c.



Temperature controllers

Series **CX200** - Sensitive element: see SB - sensors, page 18 - Relay SPDT 2 (0.5) A-230 V a.c.

MODEL	SCALE °C	DIFFERENTIAL K	OTHER CHARACTERISTICS
CX228	-10 to 120	1 to 10	wall or flush mounting



Series **TX200** - Drive and alarm relay circuits 2 (0.5) A-24 V a.c. - Supply 24 V a.c. - Sensitive element: see SP - TP sensors: pag. 10 - Flush mounting.

MODEL	DRIVE CIRCUIT		ALARM CIRCUIT		OTHER CHARACTERISTICS
	SCALE °C	DIFFERENTIAL K	SCALE °C	DIFFERENTIAL K	
TX283	-30 to 400	2 to 20	± 30 respect to set-point	2	3-point digital type



500 Line



Temperature controllers

Series **CX500** - Proportional - Integral - Derivative (PID), changeable into Proportional on field - Direct/reverse action - Supply directly from actuator - Sensitive element: see SB sensors, page 18.

MODEL	SCALE °C	PROPORT. BAND K	INTEGRATION TIME Tn (s)	DERIVATIVE TIME Td	MOUNTING
CX528	-10 to 120 °C	2 to 40	16 to 600	1/4 Tn	wall or flush



Series **TX500** - Proportional - Integral - Derivative (PID), changeable into Proportional on field - Direct/reverse action - Supply 24 V a.c. - Flush mounting - Sensitive element: see SP - TP sensors.

MODEL	SCALE °C	PROPORT. BAND K	INTEGRATION TIME Tn (s)	DERIVATIVE TIME Td	OTHER CHARACTERISTICS
TX581 TX586	-30 to 400 °C 0 to 399 °C	2 to 40	20 to 600	1/8 Tn 1/4 Tn	digital set and temperature indication
T4-20	options for TX500: output signal 4 to 20 mA				

Temperature sensors for TX500 - Sensitive element: Platinum 100 Ohm at 0 °C

MODEL	OTHER CHARACTERISTICS
SPC	immersion - AISI 304 well, 1/2" gas connection - conduit opening Ø 10 mm = 113 mm long max fluid temperature: 150 °C
TPC	immersion - 1/2" gas AISI 304 well-conduit opening Ø 10 mm 200 mm long max fluid temperature: 500 °C
421	option for SPC: AISI 304 stainless steel well and connection



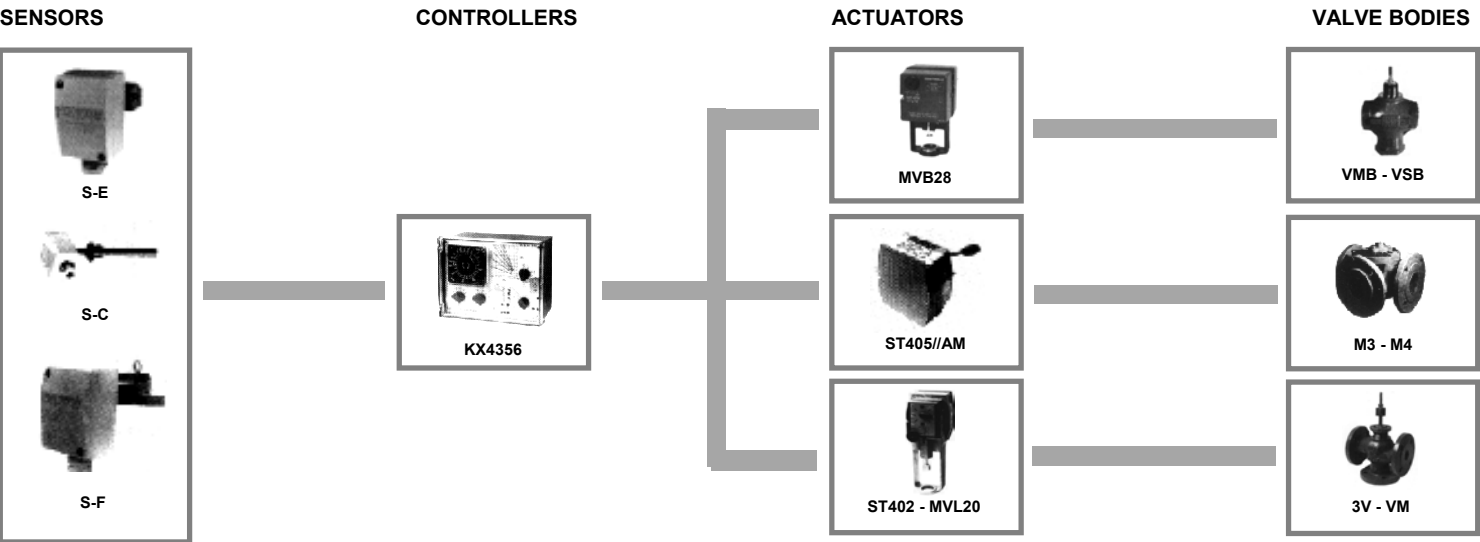
SYSTEMS AND APPARATUS FOR HEATING PLANTS AND INDUSTRIAL PROCESSES

400 Line Time Proportional Control

GENERAL INFORMATION

Controllers
They are electronic type with integrated circuit with output signal by two relays.
Signals are activated as proportional impulses, the time of which is proportional to the offset of the controlled variable temperature in respect to the set value.
Controllers control supply hot water temperature depending on outdoor temperature value and on pre-set slope.
Controlled devices
Suitable controlled devices are mixing valves motorized by MVB28 and ST402 actuators.

BASIC SYSTEM



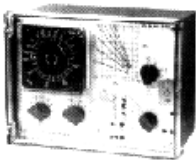
Climatic controllers

Series **KX400** - Outdoor weather compensated control for heating system - Slope Δ 0.5 to 3.5
- Supply 230 V a.c. Sensitive element: KX435 see SN - sensors, KX436 see SB- sensors page 18

MODEL	OTHER CHARACTERISTICS
KX435G	daily time switch with spring reserve -7 programs selector knob pump control circuit - SN sensors
KX435S	as above - with weekly time switch with spring reserve
KX436G	daily time switch with spring reserve -7 programs selector knob pump control circuit - SB sensors
KX436S	as above - with weekly time switch with spring reserve

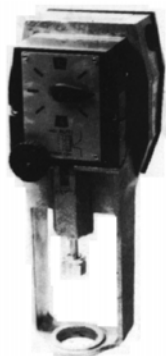
Accessories for KX400 and sensors for KX435

F1	flush mounting bracket
SNC	immersion supply water with well 1/2" gas - 117 mm length - 100 Ohm at 0 °C
SNF	strap-on supply water - 100 Ohm at 0 °C
SNE	outdoor - 300 Ohm at 0 °C



CONTROLLI

400 Line



Actuators for globe valves

Series **MVB20** - see page 37. For valve body VMB - VMB-F, see page 44.

Series **ST400** - Bidirectional actuator with hand-drive and position indicator - Angular travel: 160° - Supply 230 V a.c.

For valve bodies VMB16 see page 44 and, with accessories AG21 (pag. 46), VMB, VMB-F see page 44.

MODEL	TIMING S	TORQUE Nm	POWER CONSUMPTION VA	OTHER CHARACTERISTICS
ST402	360	15	5	for globe valves
ST2AV	assembling ST402 on valve body			

ATTENTION:

Actuators are usually supplied NOT mounted on valve bodies. In case actuators and valve bodies are required assembled, the specific part number [ST2AV] will have to be listed on the order together with the models of actuator and valve body.



Actuators for shoe and butterfly valves

Series **ST400** - Bidirectional type with hand drive - Angular travel: 90°. For valve bodies M3 - M4 and VFG10 see page 47.

MODEL	TIMING s	TORQUE Nm	SUPPLY V a.c.	POWER CONSUMPTION VA	OTHER CHARACTERISTICS
ST404	360	10	24	5	for butterfly and shoe valves M3 - M4 all size
ST405	360	10	230	5	
ST5AV	assembling ST404/405 on valve body				

ATTENTION:

Actuators are usually supplied NOT mounted on valve bodies. In case actuators and valve bodies are required assembled, the specific part number [ST5AV] will have to be listed on the order together with the models of actuator and valve body.

SYSTEMS AND APPARATUS FOR HEATING PLANTS AND INDUSTRIAL PROCESSES

DIGITROLL 4000

DIGITROLL is trade-mark of **CONTROLLI** digital systems.

RK4000

Microprocessor controller-optimizer RK4000, fitted with Liquid Crystal Display (LCD) and pressure-sensitive key pad, provides hot water supply temperature control with outside compensation, domestic hot water control, optimization depending on outside or room temperature. Supply temperature limits, pumps start-stop, heating time schedule, universal limit. P+I control, output by relays. Interface direct or by modem with Building Management Systems.

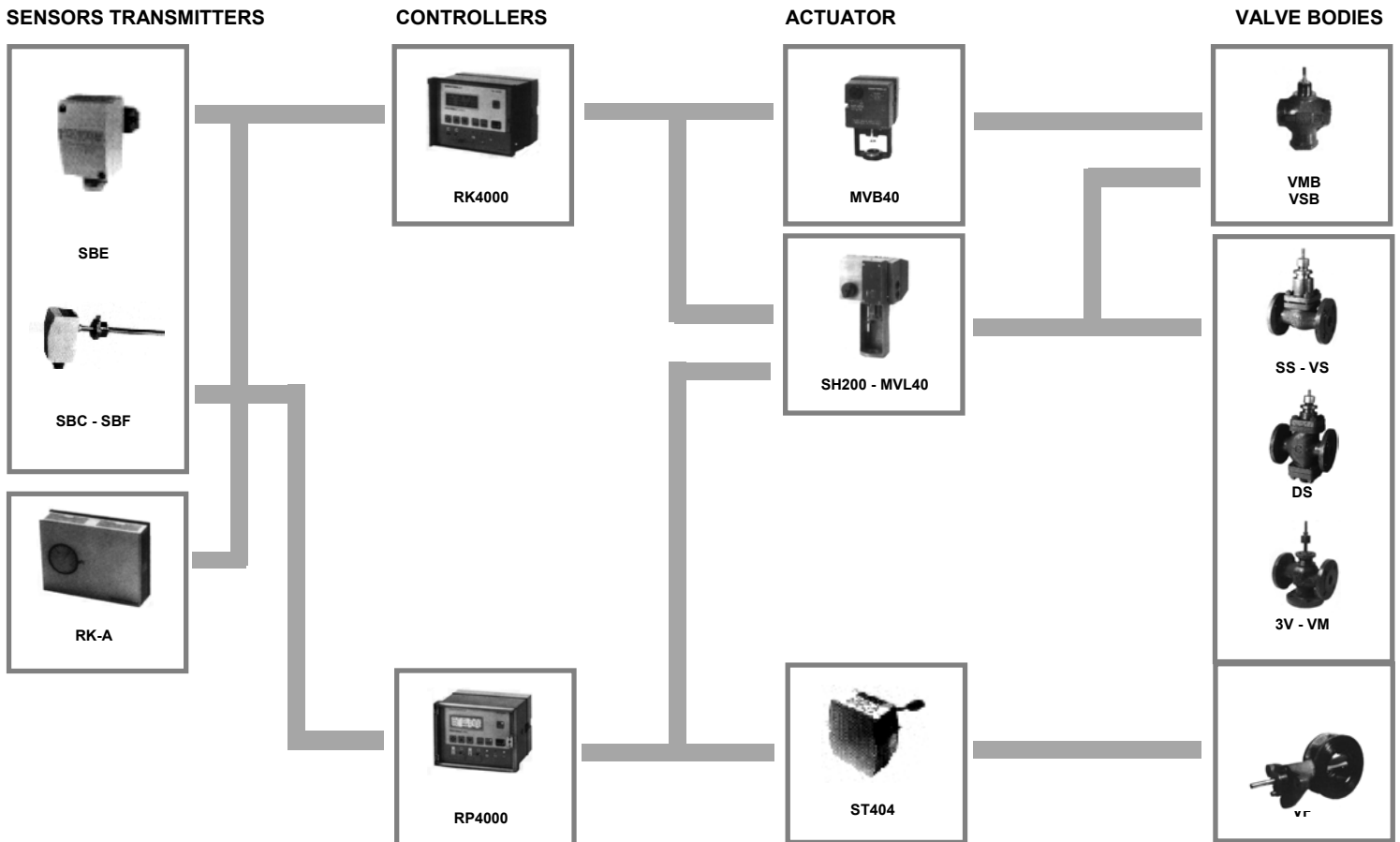
Controllers use temperature sensors SB - RK-A, valves with MVB40, SH200 and MVL40 actuators.

RP4000

Microprocessor sequence boiler programmer RP 4000, fitted with Liquid Crystal Display (LCD) and pressure sensitive key pad, provides to control supply temperature (fixed or out-door compensated) and operates motorized valves.

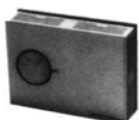
Controllers use temperature sensors SB -, transmitters TT-31, butterfly valves with bidirectional actuator ST404/405 or MDL44/AF22

BASIC SYSTEM



CONTROLLI

DIGITROLL 4000



Microprocessor controller-optimizer

Series **RK4000** - Microprocessor type - Supply 24 V a.c. - Panel or flush mounting - Sensitive elements: see sensors here below. It operates motorized valves 200 Line MVB40 - SH 222 - MVL40, see page 37 and 38.

MODEL	OTHER CHARACTERISTICS
RK4113	supply water temperature (max 120 °C) control depending on outside conditions - optimization according to outside temperature (ON SPST contact) - low and high supply temperature limits pump start/stop - domestic hot water pump priority
RM77	remote set-point adjuster

Sequence boiler programmer

Series **RP4000** - Microprocessor type - Supply 24 V a.c. - Panel or flush mounting - Sensitive element: see sensors and transmitters here below. It operates butterfly valves VFG10 motorized with ST404, see page 12 or MDL40/AF22, see page 36 and 47.

MODEL	OTHER CHARACTERISTICS
RP4102	Sequence programmer of 2 boilers with same or different capacity. Control AUTO-PERMANENT in NORMAL - REDUCED - STOP POSITION- Time programs - Time inversion of sequence - Start-stop delay time - Boilers LED signals - Open-closed valves - Inlet for optimizer - Min. and max. temperature limits - Summer compensation (add SBE sensors).



Sensors for RK4000 and RP4002

MODEL	OTHER CHARACTERISTICS
RK-A11	room temperature sensor for self-adjusting optimization (dimensions 85 x 115 x 32)
RK-A41 SBC	as above with set-point adjustment immersion temperature sensor, connection 1/8" gas in nickel plated brass - AISI 304 stainless steel well - lenght 113 mm - conduit opening Ø 10 mm max ambient temperature 50 °C - max fluid temperature 140 °C - max fluid pressure 40 bar - protection IP 43 (DIN 40050)
SBE	outside temperature sensor
SBF	strap-on supply water - 100 Ohm at 0 °C
421	AISI 304 stainless steel SBC connection



AIR CONDITIONING SYSTEMS AND APPARATUS

500 Line V d.c. Output Proportional Control

GENERAL INFORMATION

AX - CX - TX - W500 controllers, hybrid and integrated electronic circuit type.

For each variation of controlled variable into proportional band range, corresponds a proportional variation of output signal by which actuator/motorized valve assumes the relevant position by the feedback potentiometer.

Input signals:

Temperature, humidity, differential and absolute pressure sensors and transmitters.

WM master for winter-summer compensation

RM or BMS for remote set-point adjustment

Output signals:

0 to 15 V d.c. to drive in unison or in sequence controlled devices.

Direct/reverse action.

-5 to +15 V d.c. to remote analog and digital indicators recorders, auxiliary controllers.

Controlled devices.

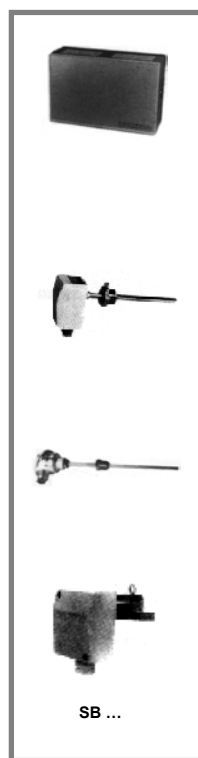
Damper actuators SM500 - SH500 - MDL50, motorized valves with SH500 - MVL50 - MVB50 - MTV5.

Auxiliaries

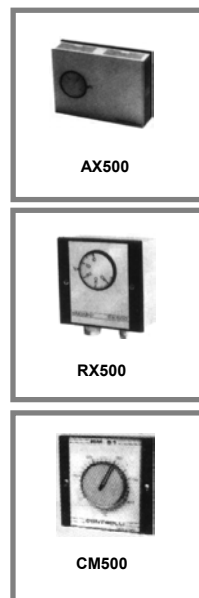
A wide range of analog and digital indicators, transducers, modules.

BASIC SYSTEM

SENSORS



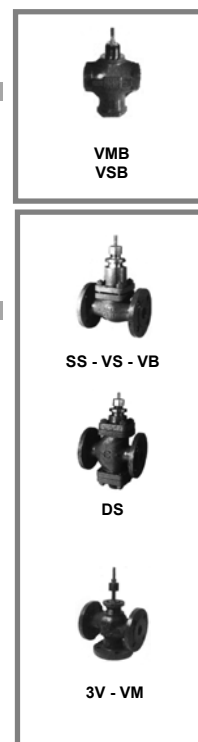
CONTROLLERS



ACTUATORS

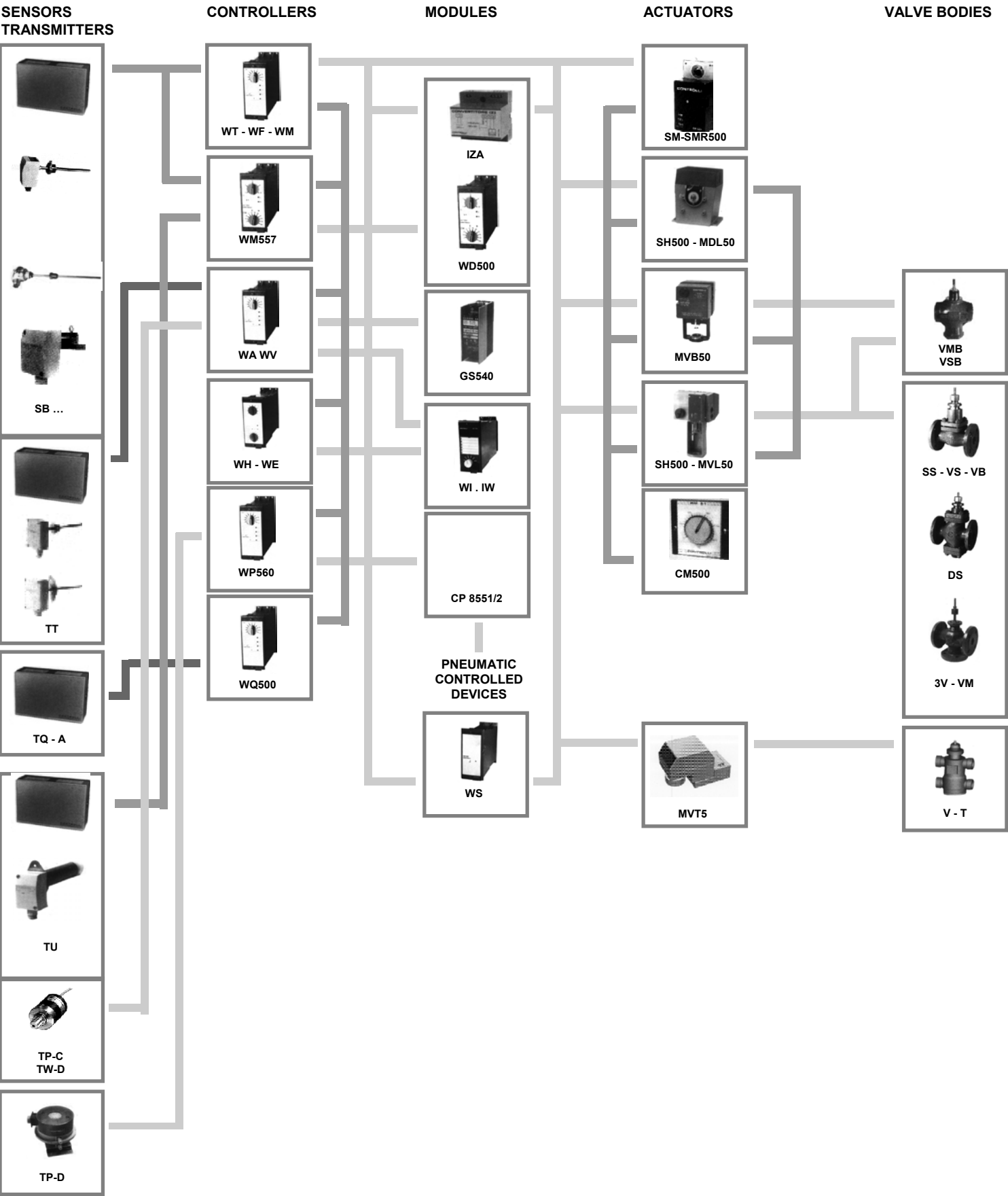


VALVE BODIES



AIR CONDITIONING SYSTEMS AND APPARATUS

BASIC SYSTEM



Room thermostats

Series **AX526** NTC sensitive element, supply 24 V a.c.

MODEL	SCALE °C	PROPORT. BAND K	SET-POINT ADJUSTMENT	OTHER CHARACTERISTICS
AX526	5 to 35	1,5	external	2 output 0...10 V d.c. dimensions 117 x 71 x 31 mm.



Temperature controllers

Series **RX500** - Direct/reverse action - Sensitive element: see SB sensors, page 18.

MODEL	SCALE °C	PROPORT. BAND K	SUPPLY	OTHER CHARACTERISTICS
RX513 RX515 RX517	0 to 45 -10 to 80 30 to 120	3 to 24	direct from actuator	panel mounting



Temperature controllers

Series **WT510** Proportional+Integrative+Derivative - Direct/reverse action
WT530 -as above with auxiliary relay 1 SPDT 2 (0.5) A - 24 V ac
WT540 -as WT510 with min or max proportional limit action
WM550 -as WT510 with compensation action
WT220 -on-off output by relay

Supply 24 V a.c. - Panel or flush mounting (see terminal board MW page 19)

Sensitive element: see SB sensor page 18, only for WM557 see TU transmitters page 34.

MODEL	SCALE °C	PROPORT. BAND % SPAN	INTEGRAL ACTION		OTHER CHARACTERISTICS	
			%	TIME sec.		
WT513 WT515	0 to 50 20 to 120	2 to 40	0 to 100	0 to 600	relay working point V d.c.	differential V d.c.
WT533 WT535	0 to 50 20 to 120	2 to 40	0 to 100	0 to 600	0 to 11	0.5 to 3
WT543 WT545	0 to 50 20 to 120	2 to 40	0 to 100	0 to 600	limit scale °C 0 to 50 20 to 120	proportional band % span 2 to 40
WM551 WM552 WM553 WM554 WM555 WM557	0 to 50	2 to 40	0 to 100	0 to 600	compensation winter + limit* winter winter + limit** summer summer + limit* reverse	∠ slope 0 to 3,5 0 to 3,5 0 to 3,5 0 to 1 0 to 1 0 to 3,5
WT223 WT225	0 to 50 20 to 120	differential K 1 2	dead zone K 1 to 10 1 to 20	relay 2 SPDT 2 (0.5) A-24 V a.c.		

* limit range: 0 to 60 °C

**limit range: 0 to 120 °C.



Anti-frost module

Series **WF590** -Module with potentiometer for minimum position of out door air damper and manual reset - Output by relay SPDT 2 (0.5) A- 24 V a.c. - Sensitive element: see SB sensors page 18.

MODEL	SCALE	DIFFERENTIAL K	SUPPLY V a.c.	OTHER CHARACTERISTICS
WF594	0 to 20	1.5	24	panel or flush mounting see accessories MW page 19

500 Line



Temperature sensors

Balco 1000 Ohm 21.1 °C sensitive element - for RX - CX228-528 - W500 controllers.

MODEL	OTHER CHARACTERISTICS
SBA	room (dimensions 85 x 55 x 32 mm)
SBA20	room dual sensitive element (dimensions 115 x 85 x 32 mm)
SBA55	room with set-point adjustable from 5 to 35 °C (dimensions 115 x 85 x 32 mm)
SBC	immersion - AISI 304 stainless steel well - 1/8" gas nickelplated brass connection - length 113 mm conduit opening Ø 10 mm - max fluid temperature 140 °C
SBD	duct-with mounting flange -rod Ø 7.5 mm -length 300 mm-conduit opening Ø 10 mm - max fluid temperature 95 °C
SBV	duct - with high velocity sensitive element - length 210 mm - max temperature 60 °C. Not suitable for applications with possible condensate.
SBE	outdoor - conduit opening Ø 10 mm
421	AISI 304 stainless steel for SBC connection

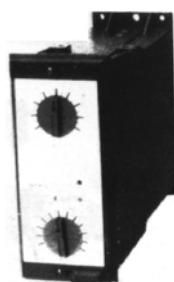
Humidity controllers

Series **WH570** - P + I + D - Direct/reverse action

WH574 -as above with auxiliary relay 1 SPDT 2 (0.5) A-24 V a.c.

WH270 -On-Off - Output by 2 relays - Dead zone 2 to 15% R.H.

Supply 24 V a.c. - Sensitive element: see TU transmitters, see page 34.



MODEL	SCALE % R.H.	PROPORT. BAND % SPAN	AUXILIARY RELAY		OTHER CHARACTERISTICS
			WORKING POINT V d.c.	DIFFERENT. V d.c.	
WH572 WH574	10 to 90 10 to 90	2 to 40 2 to 40	0 to 11	0.5 to 3	panel or flush mounting (see MW terminal boards page 19)
		differential % R.H.	relay		
WH272	10 to 90	1	2 SPDT 2 (0.5) A-24 V a.c.		

Enthalpy controller

Series **WE590** -Comparison and control enthalpy module - Proportional control with minimum damper opening set - Sensitive element: see TU transmitters, see page 34.



MODEL	MIN POSITION OUTDOOR DAMPER %	SUPPLY V a.c.	OTHER CHARACTERISTICS
WE593	0 to 100	24	panel or flush mounting (see MW page 19)

Universal controller

Series **WV** -P+ I + D -Direct/reverse action - Integral action as WT - Supply 24 V a.c. -Panel or flush mounting (see terminal board MW page 19) - Sensitive element: transmitters, see page 34.

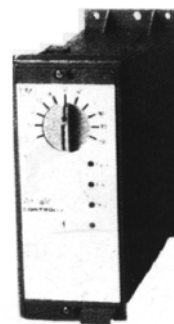
MODEL	SCALE %	PROPORT. BAND % SPAN	INPUT	OUTPUT	
				V d.c.	RELAY
WV511	0 to 100	2 to 40	0 to 10 V d.c.	0 to 10	not
WV539				0 to 10	yes

500 Line

Differential pressure controllers

Series **WP560** - Proportional + Integral + Derivative - Direct/reverse action - Sensitive element: see TP-D transmitters page 34.

MODEL	SCALE Pa	PROPORT. BAND % SPAN	SUPPLY V a.c.	OTHER CHARACTERISTICS
WP562	0 to 100 0 to 1000 0 to 2500	2 to 40	24	panel or flush mounting (see MW terminal boards)



Air quality controller

Series **WQ530**-Proportional+ Integral+ Derivative-Direct/reverse action - Sensitive element: seeTQ-A transmitters, page 34.

MODEL	SCALE %	PROPORT. BAND % SPAN	SUPPLY V a.c.	OTHER CHARACTERISTICS
WQ533	0 to 100	2 to 40	24	panel or flush mounting (see MW terminal boards)

On/Off action module

Series **WD540** - Two/four stages - Supply 24 V a.c. - panel or flush mounting - See MWD terminal boards.

MODEL	SCALE V d.c.	DIFFERENTIAL V d.c.	RELAY
WD542	3 to 12	0.5 to 3	2 SPDT 2 (0.5) 1-24 V a.c.
WD544	3 to 12	0.5 to 3	4 SPDT 2 (0.5) 1-24 V a.c.

Selector modules

Series **MM501** - Highest signal selector

Series **WS506** - Highest or lowest signal selector - Supply 24 V a.c.

MODEL	INPUT SIGNAL V d.c.	SIGNALS No.	OTHER CHARACTERISTICS
MM501	0 to 15	2	panel mounting
WS506	0 to 15	max 6	panel or flush mounting (see MW terminal boards)



Terminal boards necessary for mounting all W..... controllers and modules

MW1 MW2	for panel mounting (except WD) for flush or rack 19" mounting (except WD)
MWD1 MWD2	for panel mounting of WD540 for flush mounting of WD540

Power units

Series **GS** -Input signal 5 to 10 / 0 to 10 V d.c -TRIAC (SRC) device -Supply 24 V a.c. - For three-phase systems use no. 3 power units.

MODEL	CURRENT A	MAX VOLTAGE V a.c.	OTHER CHARACTERISTICS
GS541 GS542 GS543	25 40 60	440 440 440	panel mounting on track size 35 mm - DIN 46277/3

Electronic-pneumatic transducer modules

Series **CP8500** - Output signal 3 to 13 psi - Air supply 30 psi max - Consumption 500 NI/h.

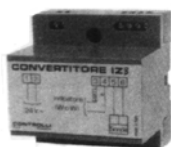
MODEL	INPUT SIGNAL		ACTION	SUPPLY	OTHER CHARACTERISTICS
	V d.c.	mA			
CP8551 CP8552	- 6 to 9, 0 to 10	4 to 20 4 to 20	direct direct	from actuator 24 V a.c.	panel mounting

CONTROLLI

500 Line

Signal transducers

Series **IZ** - Supply 24 V a.c. - Mounting on track size 35 mm DIN 46277/3



MODEL	OTHER CHARACTERISTICS
IZA	input 3 to 12 V d.c. - output 12 to 3 V d.c.
IZB	input from SB sensors - output 0 to 10 V d.c.
IZV	input 4 to 7; 6 to 9; 8 to 11; 0 to 10 V d.c. - output 4 to 20 mA

Remote set-point adjusters

Series **CM500** - Remote manual potentiometer to drive 500 Line actuators - Flush mounting.

Series **RM50** - Potentiometer for remote set-point - Flush mounting.



MODEL	SCALE	OTHER CHARACTERISTICS
CM511	0 to 10	range 6 to 9 V d.c.
RM51	0 to 50 °C	for WT- WM - WF controllers
RM52	20 to 120 °C	
RM53	10 to 90% R.H.	for WH controllers
RM54	0 to 100%	for WA - WP - WQ - WV controllers

Supply

15V d.c. supply for RX513/15/17 - CX528 and CM500.

MODEL	CHARACTERISTICS
TL51	24V a.c./15V d.c. (max 3 controllers)

CONTROLLI

700 Line Analog Proportional and Microprocessor three points Control

GENERAL INFORMATION

Controllers

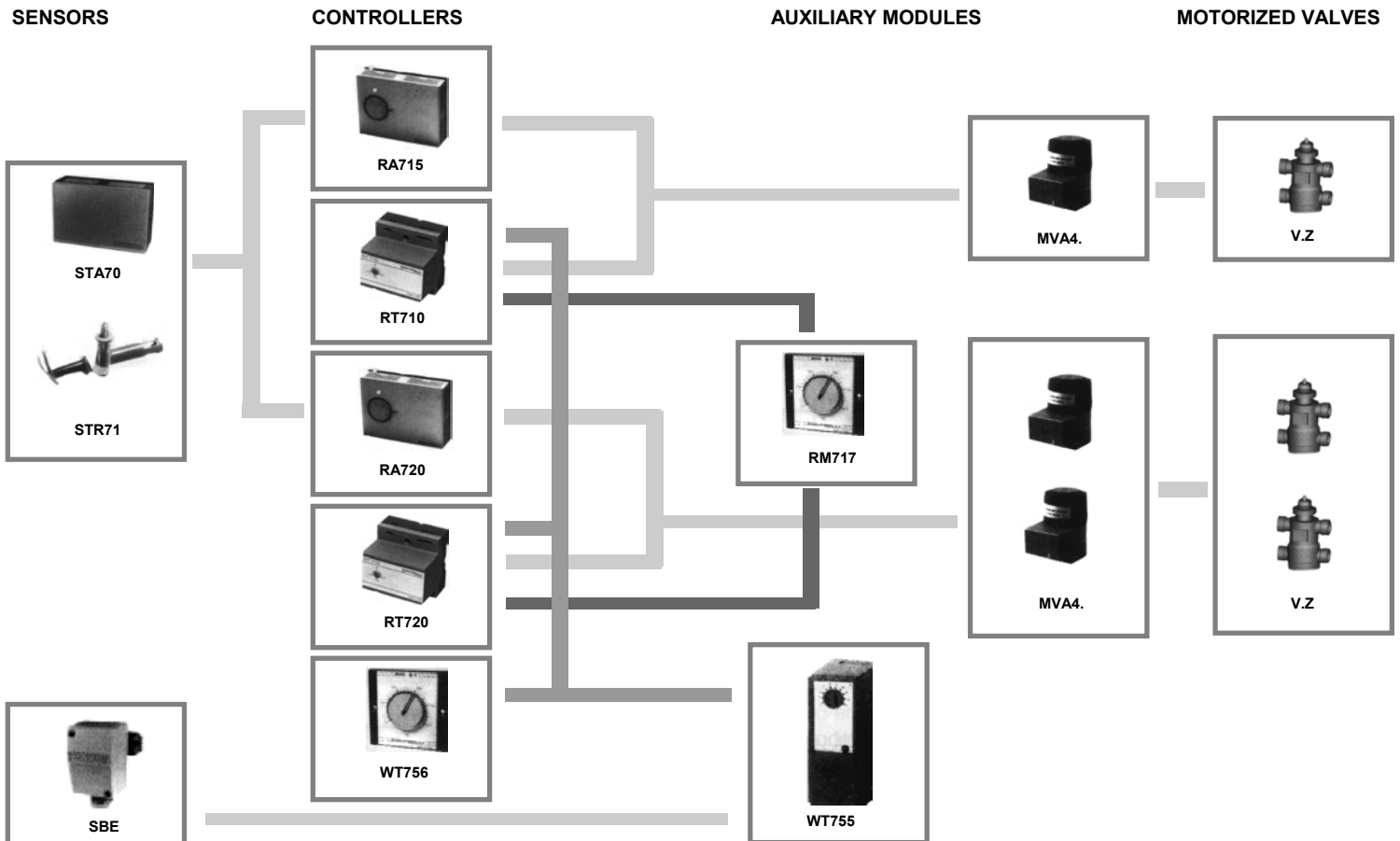
They are electronic type with integral circuits, proportional time or three points output signal by TRIAC.

They are used in air-conditioning, where it's required the proportional control of valves on 2-4 pipe fan-coil units.

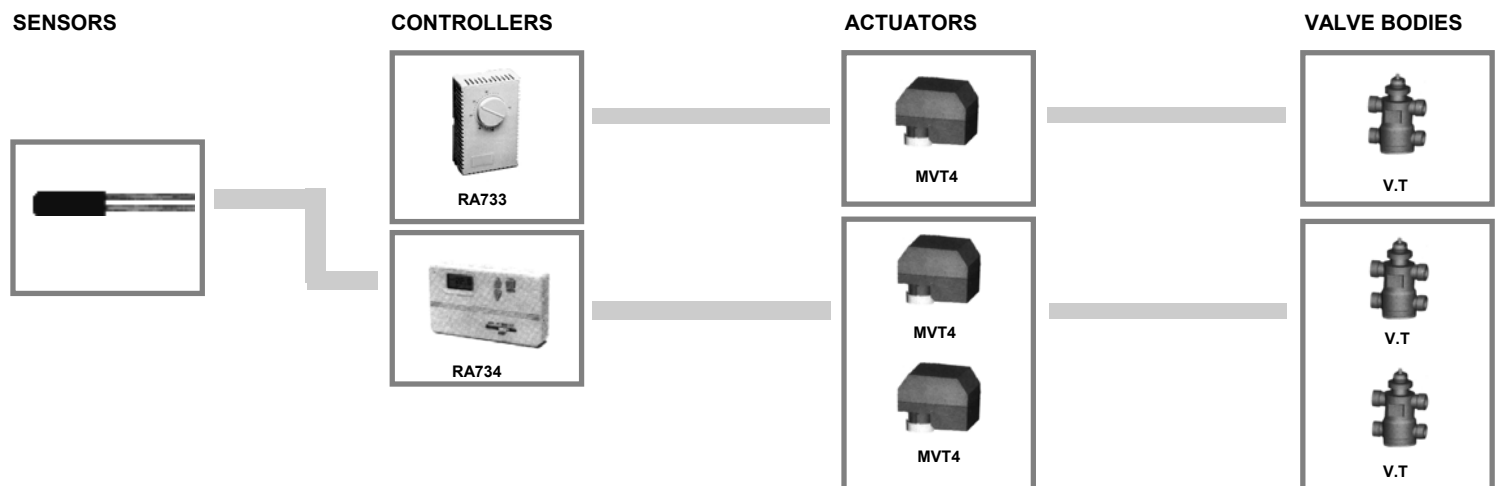
Controlled devices

The controlled devices are V-Z valve bodies with thermal actuator MVA4, and V-T valve bodies, with bidirectional actuator MVT4.

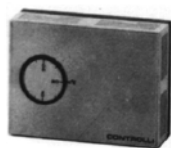
BASIC SYSTEM ANALOG PROPORTIONAL



BASIC SYSTEM MICROPROCESSOR THREE POINTS CONTROL



700 Line



Fan-coil unit controllers

Series **RA700** - Room temperature controller with built-in sensitive element and set-point selector. Proportional band 1 K - Supply 24 V a.c. - PWM (pulse with modulation) for driving V.Z. valve bodies with MVA4. actuator.

Series **RT700** - temperature controller using remote return-air duct or room sensor.

MODEL	SCALE °C	ACTION	OTHER CHARACTERISTICS
RA715 RA725	15 to 26 15 to 26	summer or winter heating-cooling in sequence	for 2-pipe fan-coil unit for 4-pipe fan-coil unit
RT715 RT716 RT725	15 to 26 15 to 26 15 to 26	summer or winter heating-cooling in sequence	for 2-pipe fan-coil unit as above with internal set-point adjust for 4-pipe fan-coil unit

Series **RA730** - Room or duct sensor temperature microprocessor controller three points action for driving bidirectional actuator (1 or 2 in sequencing) model MVT4 or MVB46. Supply 24 V a.c. Wall mounting.

MODEL	SCALE °C	ACTION	OTHER CHARACTERISTICS
RA733	0 to 35	Heating or cooling	set-point knob adjustment - 1 actuator MVT4
RA734	5 to 32	heating-cooling in sequence (2/4 pipe fan-coil unit)	digital set-point adjustment and temp. indication - Fan speed selector and on-off switch - 2 actuators MVT4 in sequencing

Auxiliary modules

MODEL	CHARACTERISTICS
RM717	start-stop fan module for the proportional insertion of electric resistance max 10 A-250 V a.c. - insertion signal 5 V~ remote potentiometer for set-point adjustment RT700 5 to 35 °C

Temperature sensors

Series **ST...** - Sensitive element: NTC 5000 Ohm at 20 °C

MODEL	OTHER CHARACTERISTICS
STA71 STA77 STA78 STA79 STR71 STR72	room (dimensions 85 x 55 x 32 mm) for RT700 room with frontal set-point adjustment 5 to 35 °C (dimens. 115 x 85 x 32 mm) for RT700 as above with internal set-point adjustment room with set-point adjustment neutral (+/-) speed selector and on-off switch (135x64x30 mm) return air duct with mounting kit for RT700 return air duct for RA734

Compensator modules

Series **WT755** - Summer compensation module of no. 100 RT700 max - Supply 24 V a.c. - Panel mounting - Input from SBE sensors, see page 18.

Series **WT756** - Consisting of a WT module plus CM manual adjuster to change set-point of max 100 RT700 - Mounting: panel mounting WT, flush mounting CM - Supply 24 V a.c.

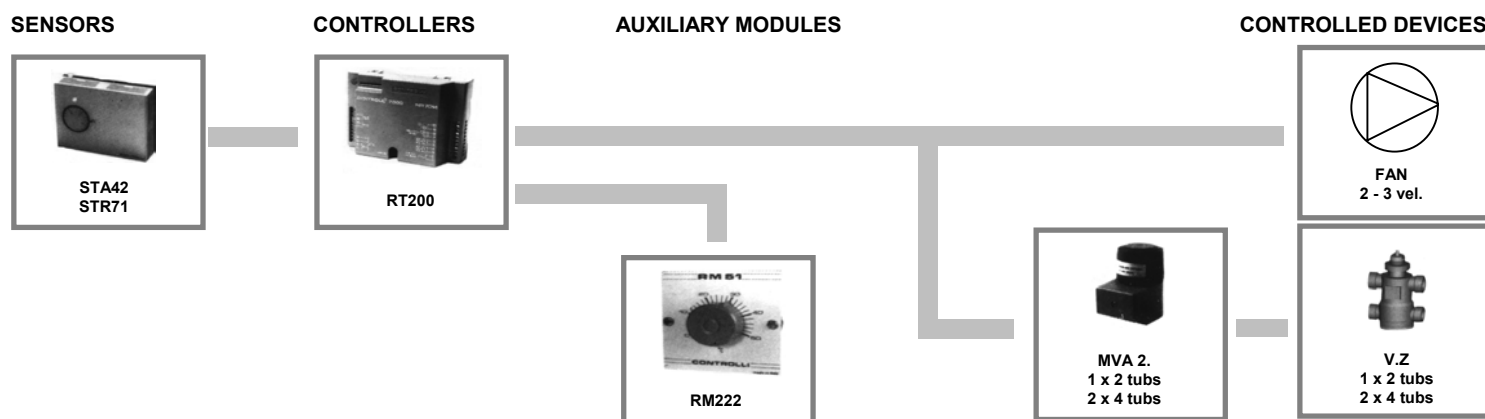
MODEL	SCALE °C	OTHER CHARACTERISTICS
WT755 WT756	5 to 35 15 to 26	compensation with authority 0 to 1, max 11 °C in respect to controller set-point set-point adjuster of RT700 controllers

RT200 3-Speed Fan-valve Sequence Control

GENERAL INFORMATION

The controllers RT200 are electronic type with integral circuits, output by TRIAC, 3 stages.
They operate in sequence the fan-speed and the on-off valve V.Z with MVA2 thermal actuator, which can be N.O. or N.C.
The temperature sensor is room type, with adjustable set-point, or duct type.

BASIC SYSTEM



3 stage fan-coil controllers

Series **RT200** - Summer/winter action - Output by relays for V.Z valve with actuators MVA and 3-speed fan control (stop-min.-med.-high) - Supply 230 V a.c. - Sensitive element: sensors ST-A42 - STR71

MODEL	SCALE °C	STEP DIFFERENTIAL K	OTHER CHARACTERISTICS
RT222	5 to 35	0.3	open valve on min. fan speed - dead zone 0,4 K - for 2 pipe FC unit
RT244	5 to 35	0.35	closed valve on min. fan speed - dead zone 0...6 K - for 4 pipe FC unit
RM222	5 to 35	-	remote set-point adjustment



Sensors for **RT200** - Sensitive element: NTC5000 Ohm at 20 °C.

MODEL	OTHER CHARACTERISTICS
ST-A42 STR71	room with adjustable set-point 5 to 35 °C (dimensions 115 x 85 x 32 mm) return air duct with mounting kit

CONTROLLI

FAN-COIL AND VAV UNITS SYSTEMS

DIGITROLL 7000 Microprocessor Control for Fan-coil and VAV Terminal Units

GENERAL INFORMATION

Controllers, microprocessor type are suitable to control FAN-COIL and VAV terminal units.

They can operate stand-alone or by Control Unit, with 1 or 2 output signal P+I action.

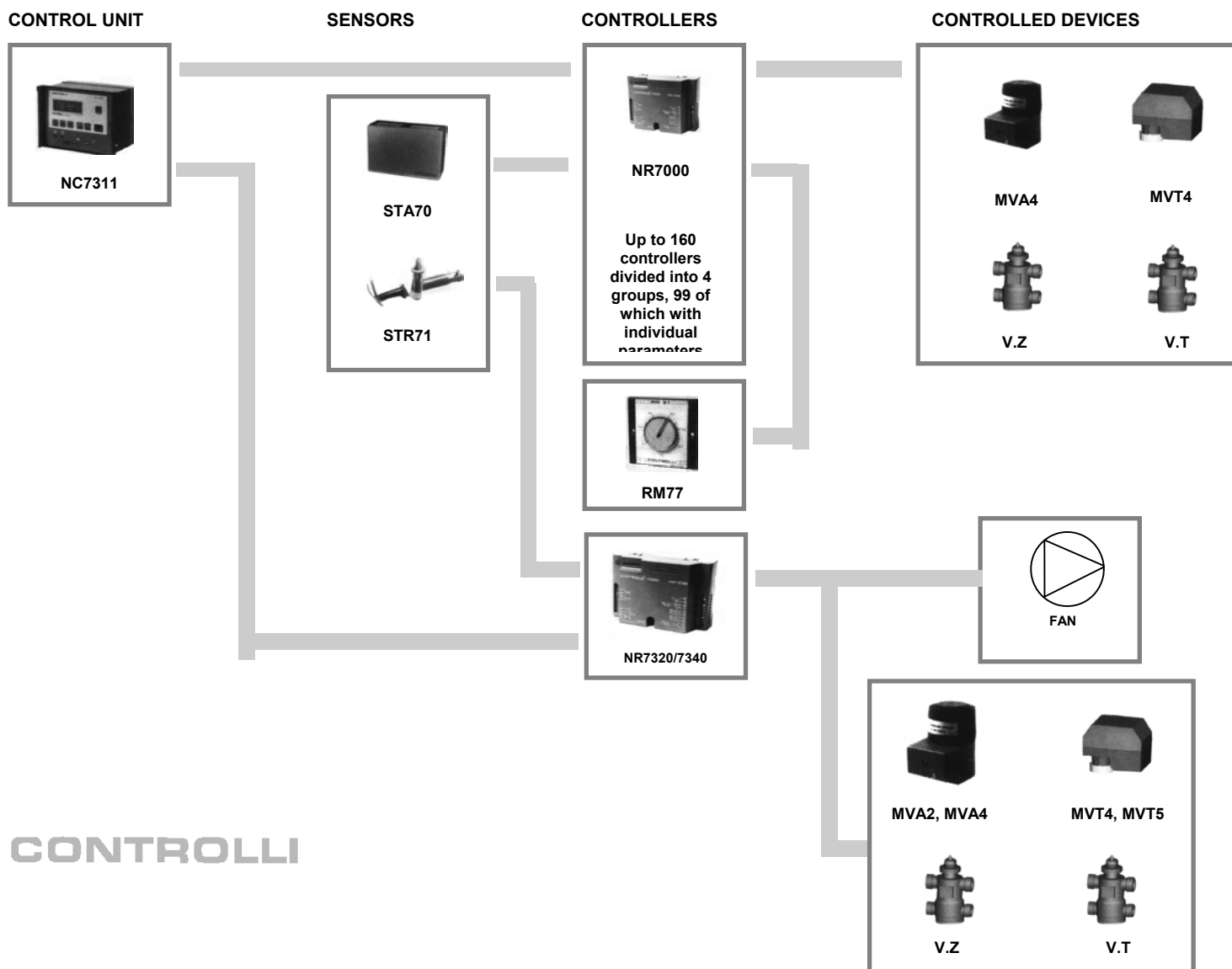
Up to 160 controllers can be operated by Control Unit (microprocessor type with LCD).

The unit can communicate with printer and Building Management System through proper interface.

Controlled devices are:

- 2 or 3 way valves with electrothermic actuator 24 Vac V.Z - MVA4. or bidirectional actuator 24 Vac V.T - MVT4
- damper actuators, bidirectional type, floating or proportional with input in Vdc - Power supply 24 Vac

BASIC SYSTEM



CONTROLLI

Control Unit

Series **NC7000** - with liquid crystal display (LCD) and pressure sensitive key board. Supply 24 V a.c. - Wall or flush mounting.

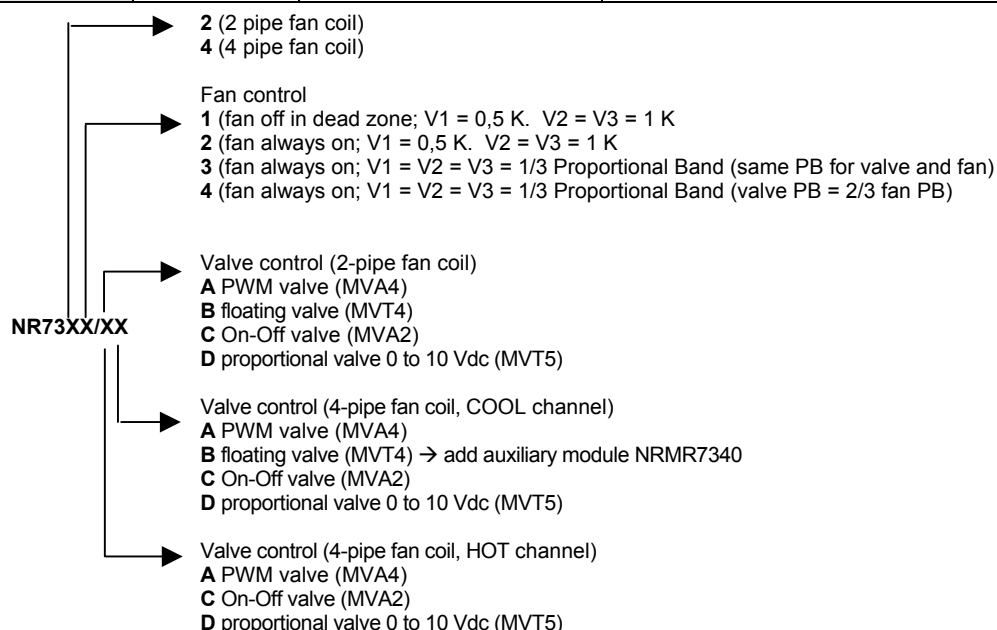
MODEL	OTHER CHARACTERISTICS
NC7311MB2F	microprocessor supervision and Control unit to operate up to 160 controllers, communication by RS232 - yearly program, summer-winter compensation - power supply 24 V a.c. and ModBus protocol. Language French/English
NC7311MB2I	microprocessor supervision and Control unit to operate up to 160 controllers, communication by RS232 - yearly program, summer-winter compensation - power supply 24 V a.c. and ModBus protocol. Language Italian/English
NC7311MB4F	microprocessor supervision and Control unit to operate up to 160 controllers, communication by RS485 - yearly program, summer-winter compensation - power supply 24 V a.c. and ModBus protocol. Language French/English
NC7311MB4I	microprocessor supervision and Control unit to operate up to 160 controllers, communication by RS485 - yearly program, summer-winter compensation - power supply 24 V a.c. and ModBus protocol. Language Italian/English



Microprocessor controllers

Series **NR7000** - P + I action - 1.5 °C P.B. - All parameters set by Control Unit with possibility to operate stand-alone - Power supply 24 V a.c. - Installation on track size 35 mm DIN 46277/3 - Sensitive element: ST sensors.

MODEL	APPLICATION	OUTPUT	OTHER CHARACTERISTICS
NR7312	2-pipe fan-coil	1 PWM output	1 V.Z/MVA4 valve, see pages 37, 40
NR7314	4-pipe fan-coil	2 PWM outputs	2 V.Z/MVA4 valves, see pages 37, 40
NR7412	2-pipe fan-coil	1 floating output	1 V.T/MVT4 valve, see pages 37, 40
NR7414	4-pipe fan-coil	2 floating outputs	2 V.T/MVT4 valves, see pages 37, 40
NR7320BE	2-pipe fan-coil	3 stage (Triac 24 Vac 4A) + 1 PWM + 1 SPDT 24 Vac	3 speed fan selector + 1 V.Z/MVA4 valve (see pages 37, 40) + electric coil
NR732xx	2-pipe fan-coil	3 stage (Triac 24 Vac 4A) + 1 On-Off or PWM or floating or proportional valve	3 speed fan selector + 1 valve with MVA4 or MVT4 or MVT5 (see pages 37, 40)
NR734xxx	4-pipe fan-coil	3 stage (Triac 24 Vac 4A) + 2 On-Off or PWM or floating or proportional valves	3 speed fan selector + 2 valves with MVA4 or MVT4 (only cooling) or MVT5 (see pages 37, 40)



DIGITROLL 7000

Microprocessor controllers

Series **NR7515/17** - P + I action - All parameters set by Control Unit with possibility to operate stand-alone - Power supply 24 V a.c. - Installation on track size 35 mm DIN 46277/3 - Sensitive element: ST sensors.

MODEL	APPLICATION	ACTION	OTHER CHARACTERISTICS
NR7515	VAV	2 outputs (0..10 Vdc, PWM)	air flow control and MVA4 valve control
NR7517	VAV	2 outputs (0..10 Vdc, floating)	air flow control and MVT4 valve control

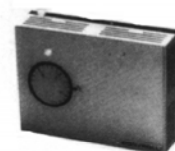


Auxiliary module for fan speed control

MODEL	APPLICATION	ACTION	OTHER CHARACTERISTICS
NRMR7340	4-pipe fan coil	3 stages relay 230 V ac	<u>Needed when using NR734XXB controllers</u>
NRMR7340A	4-pipe fan coil	3 stages relay 230 V ac	Can be used with NR732XX and NR734XXA/C/D

Remote set point

MODEL	OTHER CHARACTERISTICS
RM77	remote set-point adjuster ± 3 K - Flush mounting
RM77S	as above with speed selector and on-off switch (dim. 135 x 64 x 30 mm)



Sensors

Series **ST** for temperature - Sensitive element: NTC5000 Ohm at 20 °C for NR controllers.

MODEL	OTHER CHARACTERISTICS
STA71	room (dimensions 85 x 55 x 32 mm)
STA75	room with ± 3 K set-point, adjustment (dimensions 115 x 85 x 32 mm)
STA75S	as above dimensions 86x86x37 mm
STA80	room with ± 3 K set-point and speed selector and on-off switch (dim. 135 x 64 x 30 mm)
STA80S	as above dimensions 86x86x37 mm
STA81	room with ± 3 K set-point, comfort/stand-by state switch and speed selector and on-off switch (dim. 135 x 64 x 30 mm)
STR71	return air duct with mounting kit



Address keys

Series **NS** - Plug-in electronic card for identification of each controller by Control Unit.

MODEL	OTHER CHARACTERISTICS
NS71	package with 40 pcs
NS72	package with 80 pcs
NS73	package with 120 pcs
NS74	package with 160 pcs

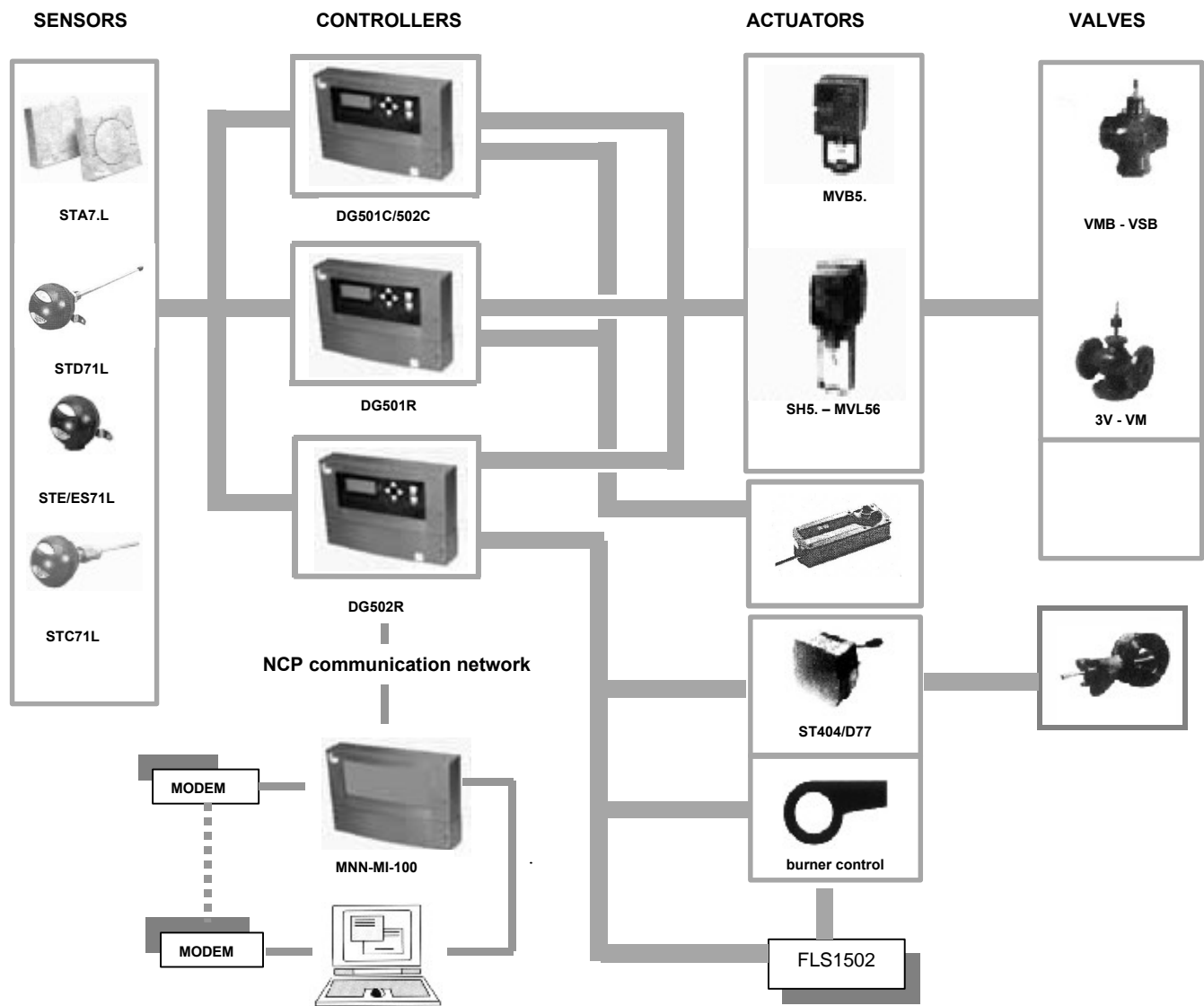
TERMINAL UNITS CONTROL

Controller	Transmitters	Action	S/W Changeover	Summer Compens.	On/off Fan	Man. selector fan speed	1 valve control		2 valve control		Supply V a.c.
							2 pos.	prop./3 points	2 pos.	prop./3 points	
AS202A	Inside	on/off	Centralized		X						
AS204A	Inside	on/off	On board		X						
AS205	Inside	on/off	On board		X	X	X				
AX212A	Inside	on/off	Centralized		X	X	X				230
AX212A	STR74	on/off	Centralized		X	X	X				230
AX214A	inside	on/off	On board		X	X	X				230
AX214A	STR74	on/off	On board		X	X	X				230
RA733	inside	3 points	Centralized							MVT4/V-T	24
RA734	Inside	3 points	Individual			X			X	MVT4/V-T	24
RA734	STR72	3 points	Individual			X			X	MVT4/V-T	24
RA715	Inside	PI	Centralized	Analogic				MVA4/V-Z-B			24
RA725	Inside	PI	Centralized	Analogic						MVA4/V-Z-B	24
RT715	STA71/77/78 STA79- STR71	PI	Centralized	Analogic		Only with STA79		MVA4/V-Z-B			24
RT716	As above	PI	Centralized	Analogic		c.s.		MVA4/V-Z-B			24
RT725	As above	PI	Centralized	Analogic		c.s.				MVA4/V-Z-B	24
RT222	STA42- STR71	PI	Centralized		3 sequences	c.s.	X				230
RT244	STA42- STR71	PI			3 sequences	c.s.			X		230
NR7312	STA71/75/80 STR71	PI	via bus	via bus		Only with STA80		MVA4/V-ZB			24
NR7314	As above	PI		via bus		As above				MVA4/V-Z-B	24
NR7412	As above	3 points	via bus	via bus		As above		MVT4/V-T			24
NR7414	As above	3 points		via bus		As above				MVT4/V-T	24
NR7320BE	As above	PI/3 points	via bus	via bus	3 sequences		Electric coil	MVA4/V-ZB			24
NR7321/2/3 /4x**	As above	PI/3 points P	via bus	via bus	3 sequences		X	MVA4/V-ZB MVT4/MVT5- V-T			24
NR7341/2/3 /4xx**	As above	PI/3 points	via bus	via bus	3 sequences				X	MVA4/V-ZB MVT4/MVT5- V-T T4	24
NR7515	As above	PI	via bus	via bus				For VAV 1 output 0 to 10 Vdc + MVA4/V.ZB			24
NR7517	As above	PI	via bus	via bus				For VAV 1 output 0 to 10 Vdc + MVT4/V.T			24

2 position valve model: 2 way VSM-MVA2/VSZB (230 Vac), MVA4/VSZB (24 Vac); 3 way VDM-MVA2/VMZB (230 Vac) MVA4/VMZB (24 Vac); 3 way-4 connection MVA2/VTZB (230 Vac); MVA4/VTZB (24 Vac)

DIGITROLL 500

BASIC SYSTEM





HVAC DDC controllers

Series **DG500** – Pre-programmed controllers for air conditioning and heating applications. Each application is activated by connecting the related peripherals.

10 Universal Inputs (NTC sensors model ST.7.L, Transmitters 0...10 V-, contact SPST) + 2 Digital Inputs. 6 Digital Outputs + 4 Analog Outputs 0...10 V-

It uses a fully interactive LCD display. Supply 24 V a.c., 15 VA. Dimensions: 244X165X55 mm. Wall mounting on track size 35 mm DIN 46277/3 or flash mounting with Kit DG510. Protection IP40. DG500 controllers can operate as stand-alone or connected to a communications network NCP (Native Communications Protocol).

MODEL	OTHER CHARACTERISTICS
DG501C	<p>Controller for Main air conditioning with fan coil water.</p> <p>Applications:</p> <ol style="list-style-type: none"> 1. Main air, 2 coils (heating, cooling), humidification. Control of saturation point with compensation or at set value, on-off humidostat, anti frost thermostat 2. Main air, 2 coils (heating, cooling), humidification. Control of saturation point with compensation or at set value, on-off humidostat, anti frost thermostat + 2-pipes fan coil water production. Hot water control with compensation or at set value, cool water control at at set value. 3. Main air, 2 coils (heating, cooling), humidification. Control of saturation point with compensation or at set value, on-off humidostat, anti frost thermostat + 4 fan coil tubes water production. Hot water control with compensation or at set value, cool water control at set value. 4. Main air, 3 coils (heating, cooling, post heating), humidification. Control of saturation point and immersion air temperature compesate or at set value, on-off humidostat, anti frost thermostat . 5. Main air, 3 coils (heating, cooling, post heating), humidification. Control of saturation point and immersion air temperature compesate or at set value, on-off humidostat, anti frost thermostat + 2 fan coil tubes water production. Hot water control with compensation or at set value, cool water control at at set value. 6. Full Air, 2 coils (heating, cooling), humidification. Room temperature control with compensation (summer) or at set value, min. limit action. On-off humidostat, anti frost thermostat. 7. Full Air, 3 coils (pre heating, heating, cooling), humidification. Pre heating control and room temperature control with compensation (summer) or at set value. On-off humidostat, anti frost thermostat. 8. 2-pipes fan coil water production. Hot water control with compensation or at set value, cool water control at set value. 9. 4-pipes fan coil water production. Hot water control with compensation or at set value, cool water control at set value.
DG502C	<p>Controller for Air Handling Unit at constant flow.</p> <p>Applications:</p> <ol style="list-style-type: none"> 1. AHU with 2 coils (heating, cooling), humidification. Room or duct temperature control, enthalpy control or outside/duct temperature control by dampers action. Minimum positioning of outside air. Manual (optional) room set point. Anti frost thermostat. 2. AHU with 2 coils. As application 1 with min. limit action at immersion air. 3. AHU with 3 coils (heating, cooling, post heating), on off humidification. Control of room or duct temperature, enthalpy or only out side/duct temperature control with dampers action. Min. positionig of outside air. Manual (optional) room set point. Anti frost thermostat. 4. AHU with 3 coils. As applications 1. or 2. with proportional humidification. 5. AHU with 2 coils. As applications 1. to 4. + electric coil On-Off control.

DIGITROLL 500



MODEL	OTHER CHARACTERISTICS
DG501R	Controller for heating climatic control and hot water service . Applications: 1. One zone with climate control + 2 position hot water service . Optimised time schedule, economy function, frost protection. 2. Two zones with climate control + 2 position hot water service . Optimised time schedule, economy function, frost protection. 3. Three zones with climate control + 2 position hot water service . Optimised time schedule, economy function, frost protection. 4. One zone with climate control + 2 position and proportional hot water service . Optimised time time schedule, economy function, frost protection. 5. Two zones with climate control + 2 position and proportional hot water service . Optimised time schedule, economy function, frost protection. 6. Three zones with climate control + 2 position and proportional hot water service . Optimised time schedule, economy function, frost protection.
DG502R	Controller for heating plant with sequencing boilers . Applications: 1. Two sequencing boilers 2. Two sequencing boilers + 1 heating zone climate control . Optimised time schedule. Frost protection. 3. Three to six sequencing boilers (with multi stages module Mod. FLS1502), 1 climate zone + On-Off or proportional hot water service . Antilegionella function.
DG510	Flash mounting Kit for DG500 controller
FLS1502	6 stages sequencing module SPDT (5A 240 V c.a. Action signal 0..10 V-. Supply 24 V c.a., 10 VA. Wall or flash mounting, dimensions 80x149x179 mm. Application with DG502R controller.

Sensors, transmitters and manual set.

Series ST.7.L NTC sensors 10 kOhm, at 20 °C 5573 ohm.

Transmitters 0...10 V cc, see page 34.

MODEL	OTHER CHARACTERISTICS
STA71L	Room sensor - dimensions 86x86x30 mm - IP 30
STA75L	Room sensor, set 10...35°C – dimensions 86x86x30 mm - IP 30
STC71L	Immersion sensor – range -10.. 120 °C - 1/2" connection – immersion length 120 mm - IP 65
STD71L	Duct sensor – range -5..100°C - immersion length 100 to 330 mm - IP65
STE71L	Outside sensor – range -20..40 °C - IP 65
STES71L	Sun outside sensor – range -20..40 °C - IP65
STF71L	Strap-on supply water – range 0.. 100 °C - IP 65
RM55L	Room set point 5...50 °C – dimensions 86x86x30 mm - IP20

DIGITROLL 2000 (Digitroll is CONTROLLO digital system trade mark).

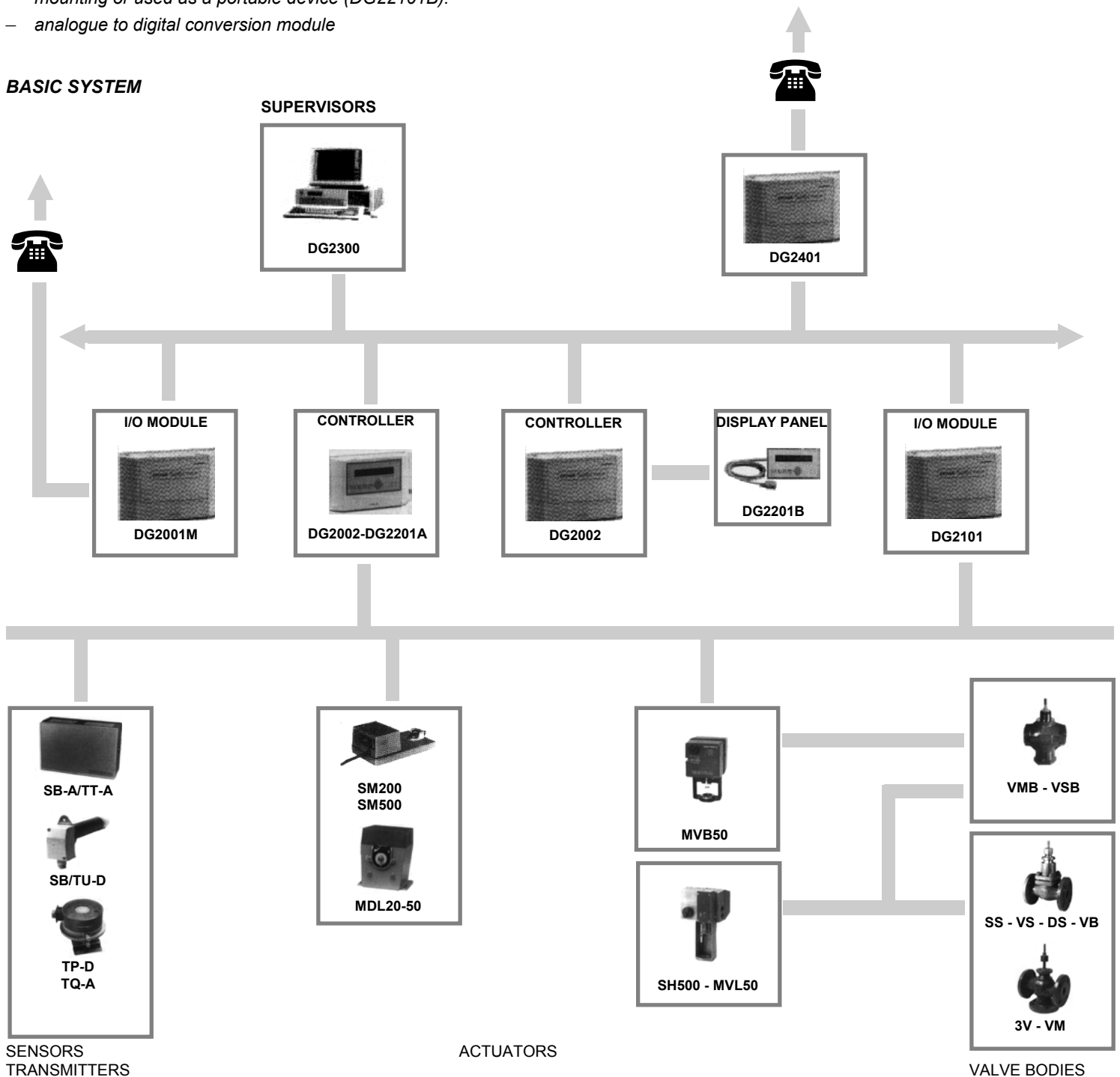
The below listed equipment is connected to LONWORKS communication bus:

- DG2002 controllers: carries on monitoring and control operating strategies on heating and conditioning plants. Data processing and acquisition is referred - via communication bus - to I/O modules. The controller has no display panel, but one can always be applied plug-in.
- DG2101 I/O module: configuration via communication bus from controller. The module receives and sends signals and controls both to and from the field.
- PC: Thanks to DG2300 software the operator is able to operate the centralized management of all the controlled plants.

Also available:

- DG2200 display panel with keyboard for managing the controller. The panel can be either fitted to controller (DG2201A) by panel mounting or used as a portable device (DG22101B).
- analogue to digital conversion module

BASIC SYSTEM



DIGITROLL 2000

DIGITROLL 2000 (Digitroll is CONTROLLI digital system trade mark)

Controller

DDC controller working either stand - alone or within a supervision system for management and control of air-conditioning and heating plants. It is connected via communication bus to one or more DG2101 I/O module (max. Nr 4 for DG2001M, nr. 3 for DG2002). It is supplied without display panel. Panel mounting. Plastic case. Protection IP30.

MODEL	DESCRIPTION	SUPPLY	ABSORPTION	DIMENSIONS
DG2002	Digital controller with onboard I/O module (16 Inputs* / 8 Outputs)	24 Vac	32 VA	320 x 200 x 70 mm
DG2002M	As above with integrated card for individual modem	24 Vac	12 VA	320 x 200 x 70 mm

* SB sensor (see page 18), ST - sensors (see page 22), Transmitters 0 ÷ 10 Vdc/4 ÷ 20-mA (see page 34).

I/O Modules

Module is connected via communication bus (shielded, twisted, bifilar cables) to DG2001M(max n. 4 modules) or DG2002 (max. n. 3 modules) controller. Max distance of module from controller 1 km with optimized topology. Wall mounting. Plastic case. Protection IP 30.

MODEL	INPUTS	OUTPUTS	SUPPLY	ABSORPTION	DIMENSIONS
DG2101	16 univ*	8 univ**	24 V a.c.	32 VA	320 x 200 x 70 mm

* SB sensor (see page 18), ST - sensors (see page 22), Transmitters 0 ÷ 10 Vdc/4 ÷ 20-mA (see page 34).

MODEL	SERVICES
DG2801 DG2901	Engineering for n. 1 DG2101 I/O module (24 points) Start - up for n.1 DG2101 I/O-module

Display panel

The panel can be fitted (plug - in) to DG2001 controller, wall-mounted or used as a portable unit. Cable connection. Protection IP 30.

MODEL	DESCRIPTION	DIMENSIONS
DG2201A	A plug-in fitted on controller. 4 lines, 40 columns 8-key keyboard, signalling led	217 x 122 x 18 mm
DG2201B	As above with 3 m length cable for panel mounting or portable usage	217 x 122 x 18 mm

System modem

MODEL	OTHER CHARACTERISTICS
DG2401	For self-selecting asynchronous transmission

Supervisors

Software modules on high density (1,44) 3,5" microdisk. LONWORKS module to be installed on PC. Operative on Microsoft Windows NT, supervisors are likely to run on any INTEL/WINDOWS NT compatible PC. Instruction and programming manuals available.

MODEL	OTHER CHARACTERISTICS
DG2301	FND-A, system configuration-installation, RTDB-A interface database; ADB-A alarm data base configuration management; PDB-A hystorical file configuration; PDD stored data display
DG2302	As above with also GMSD, DDE and graphs development, current and memorized data analysis and generation
DG2303	As DG2301 without PDB-A historical file configuration



They are the sensitive elements and controlled devices mounted on field, that is air handling units, heating and cooling power stations, batteries, exchangers, industrial processes, etc.

Field devices are:

TRANSMITTERS of temperature, humidity, pressure and air quality. Output signals: 0 to 10 V d.c. - 4 to 20 mA.

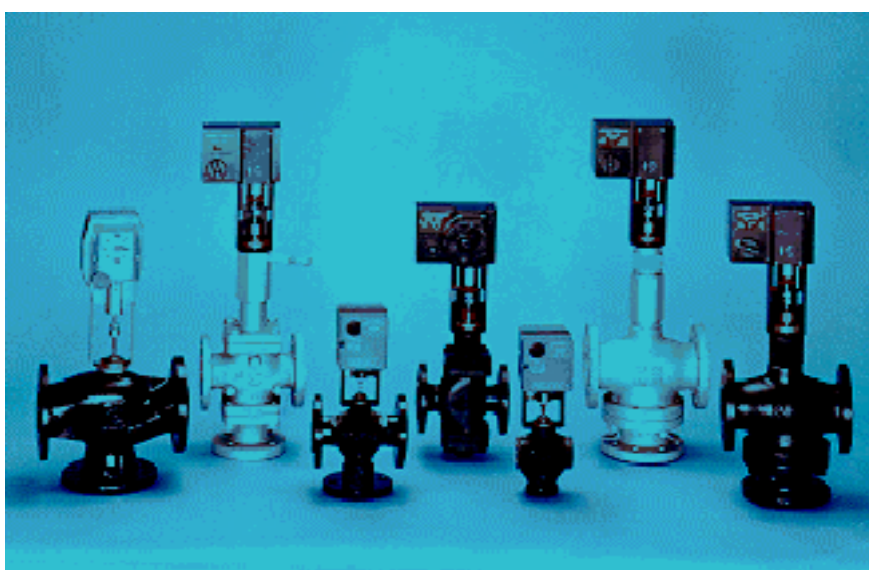
DAMPER ACTUATORS, direct and crank-arm mounting type. On-off, floating, proportional controls.

GLOBE VALVES ACTUATORS to motorize globe-valve bodies. On-off, floating, proportional controls.

MOTORIZED VALVES, consisting of actuator/linkage valve body in compact construction, available for size up-to 2".

VALVE BODIES

- globe type 2-way single seat, 2-way balanced, 2-way double seat, 3-way - body rating: 16 - 25 - 40 bar - size: 15 to 200 mm.
- butterfly type, body rating 10 bar - size 40 to 200 mm.
- shoe type, 3-4 port, body rating 10 bar - size: 25 to 100 mm.
- All CONTROLLI valves are PED compliant ("Pressure Equipment Directive" 97/23/CE)



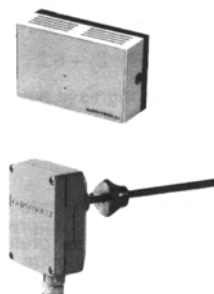
FIELD DEVICES

Transmitters

Temperature transmitters

Output signal 0 to 10 V d.c. or 4 to 20 mA - "Integrated" sensitive element for WV - WA500 controllers, see page 18.

MODEL	RANGE °C	OUTPUT SIGNAL	APPLICATIONS
TT-A21	0 to 50	4 to 20 mA	room - dimensions 115 x 85 x 32 mm
TT-A31	0 to 50	0 to 10 V dc	as above
TT-C21	0 to 100	4 to 20 mA	immersion - 113 mm stainless steel well - ½" connection
TT-C31	0 to 100	0 to 10 V dc	as above
TT-D21	-50 to 50	4 to 20 mA	duct
TT-D31	-50 to 50	0 to 10 V dc	as above
TT-E21	-50 to 50	4 to 20 mA	outside
TT-E31	-50 to 50	0 to 10 V dc	as above



Output signal 4 to 20 mA - Sensitive element Pt 100 Ohm at 0 °C for controllers WA, see page 18.

MODEL	RANGE °C	APPLICATIONS
TT-C23	0 to 300	immersion - length 175 mm - stainless steel connection ½" gas
TT-C24	0 to 500	as above

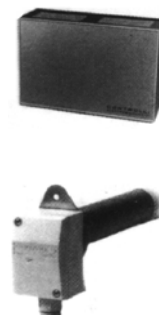


Humidity transmitters

Series TU - Sensitive capacitance element 10 to 90% R.H. - For WH - WM557 controllers, see pages 17-18.

Series TUT - Humidity sensitive element and Balco 1000 Ohm at 21.1 °C temperature sensitive element - For WE - WH - WT - WM controllers, see pages 17-18.

MODEL	SIGNAL	OTHER CHARACTERISTICS
TU-A22	4 to 20 mA	room (dimensions 115 x 85 x 32 mm) - IP 30
TU-A32	0 to 10 V dc	as above
TU-D22	4 to 20 mA	duct - rod Ø 25 mm - length 200 mm - IP 55
TU-D32	0 to 10 V dc	as above
TUTA32	0 to 10 V dc / Ohm (temp.)	room (dimensions 115 x 85 x 32) temperature sensitive element - IP 30
TUTD32	0 to 10 V dc / Ohm (temp.)	duct - rod Ø 25 mm - length 200 mm with temperature sensitive element - IP 55



Pressure and differential pressure transmitters

Series TP - Output signal 0 to 10 V d.c. for WP560 controllers (TP-D), see page 19, and WV500 (TP-C), see page 18.

MODEL	RANGE	MAX PRESSURE	APPLICATIONS
TP-C31	0 to 100 kPa	2000 kPa	not aggressive gas and liquids differential pressure, IP54
TP-C34	0-500/1000/2000 kPa	+300%	not aggressive gas and liquids pressure, IP65
TP-C351	0 to 600 kPa	1200 kPa	not aggressive gas and liquids differential pressure, IP54
TP-C361	0 to 1000 kPa	1200 kPa	as above
TP-D311	0 to 100 Pa	10 kPa	as above
TP-D332	0-625/1250/2500 Pa	70 kPa	air and not aggressive gas differential pressure, IP54 as above, IP65



Room air quality transmitters

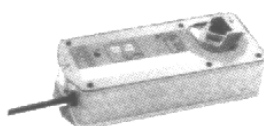
Series TQ - Output signal 0 to 10 V dc - supply 24 V ac for WQ533 controller, see page 19.

MODEL	OTHER CHARACTERISTICS
TQ-A31	room - range 1 to 100% (dimensions 115 x 85 x 32 mm)



Actuators
Damper actuators for direct mounting on the damper shaft

Series **SB** - **SM** - **SMR200** - Bidirectional motor - Hand drive device - Angular travel 90° - On-Off control. Protection IP42



MODEL	TIMING s	TORQUE Nm	SUPPLY V a.c.	POWER CONSUMPT. VA	OTHER CHARACTERISTICS
SB246	80 to 110	4	230±10%	12	for dampers 0.8 m ²
SM225	90 to 150	15	24±20%	4	for dampers 3 m ² max
SM245	80	15	230±10%	13	for dampers 3 m ² max
SMR226	150 (16)	15	24±20%	10	spring return type
SMR246	150 (16)	15	230±10%	11	for dampers 3 m ² max
SMR226S	150 (16)	15	24±20%	10	as above with auxiliary
SMR246S	150 (16)	15	230±10%	11	contacts

Note: values in brackets express spring return timing.

Series **SM** - **SMR500** - Bidirectional motor with electronic card - Input signals: 2 to 12 V d.c. - Angular travel 90° - Supply 24 V a.c. Protection IP42.

MODEL	TIMING s	TORQUE Nm	POWER CONSUMPT. VA	OTHER CHARACTERISTICS
SM526	100 to 200	15	3	for dampers 3 m ² max
SMR526	150 (20)	15	10	spring return type for dampers 3 m ² max

Auxiliary contacts for SM225, SM245 and SM526

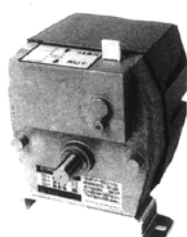
S1-1 S2-1	1 SPDT 10 (3) A-250 V a.c. adjustable on whole stroke as above but 2 SPDT
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Accessories for SM and SMR. To drive two dampers add

KH8 KG8	crank-arm for damper shaft \varnothing 10 to 18 or \square 10 to 14 mm with slot 6.2 mm ball joint for KH8 crank-arm, \varnothing 8 mm
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Actuators for dampers: crank-arm - linkage kit mounting type

Series **SH** - Bidirectional motor with electronic card - Shaft \varnothing 16 mm - Auto-manual device - Power consumption 9 VA - Angular travel 90° - Max damper surface m² 2.5 - Protection IP44.



MODEL	TIMING s	TORQUE Nm	SUPPLY V a.c.	ACTION
SH225 SH245	45 45	12 12	24 230	On-Off, floating
SH525	45	12	24	with electronic card and 300 Ohm feed-back potentiometer (500 Line - DG2000) range 6 to 9, 4 to 7, 8 to 11, 0 to 10 V d.c., 4 to 20 mA

Accessories for SH

MODEL	DESCRIPTION
D5 S10 YS7 S24H60	one end stroke auxiliary microswitch damper crank-arm \varnothing 16 mm damper drive linkage in addition to S10 consisting of: crank-arm for damper shaft \varnothing 12 mm joint connection, connecting rod \varnothing 8 mm x 500 mm supply 24 V 60 Hz

Actuators

Actuators for dampers: crank-arm - linkage kit mounting type

Series MDL - Bidirectional motor-Driving input signal P.C. board - 2 out-put shaft: main and seconds shaft □ 9.5 x 9.5 mm - Force 500 N - Hand drive device - Protection IP 55.

MODEL	TIMING s 90° - 160°	TORQUE Nm	ANGULAR TRAVEL ADJUSTABLE	SUPPLY V a.c.	MAX DAMPER SURFACE m ²	ACTION
MDL22	15 - 27	6	0 to 160	230	1.5	On-Off, floating
MDL24	40 - 71	20	0 to 160	230	3.5	
MDL26	60 - 107	30	0 to 160	230	4.5	
MDL42	15 - 27	6	0 to 160	24	1.5	
MDL44	40 - 71	20	0 to 160	24	3.5	
MDL46	60 - 107	30	0 to 160	24	4.5	
MDL62	15 - 27	6	0 to 160	110	1.5	
MDL64	40 - 71	20	0 to 160	110	3.5	
MDL66	60 - 107	30	0 to 160	110	4.5	
MDL32	15 - 27	6	55 to 160	24	1.5	with 300 Ohm balance potentiometer (300 Line)
MDL34	40 - 71	20	55 to 160	24	3.5	
MDL36	60 - 107	30	55 to 160	24	4	
MDL52	15 - 27	6	55 to 160	24	1.5	with electronic card and 300 Ohm feed-back potentiometer (500 Line -DG2000) range 6 to 9, 4 to 7, 8 to 11, 1 to 5, 0 to 10 V d.c., 4 to 20 mA
MDL54	40 - 71	20	55 to 160	24	3.5	
MDL56	60 - 107	30	55 to 160	24	4.5	

MDL20/40/60 can be supplied with auxiliary potentiometer 1 K Ohm. By ordering, add. PA to model, by ex. MDL24PA.

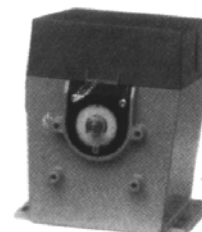
MDL can be assembled with butterfly valves body, see pag 43.

Options for MDL32-34-36.

MDLS5	electronic card input signal range 6 to 9, 4 to 7, 8 to 11, 1 to 5 V d.c., 4 to 20 mA.
MDLV5	electronic card input signal range 0 to 10 V d.c., 4 to 20 mA adjustable start point and span

Accessories for MDL

MODEL	DESCRIPTION
DMDL MDLA1	two auxiliary microswitch SPDT 10 (3) A - 240 V a.c. adjustable on the whole stroke damper drive linkage
YS7 MDLA2	crank-arm in additional to MDLA1 linkage for mounting MDL when replacing SL
MDLPA2 MDLPA4 MDLPA6	card with 1 K Ohm auxiliary potentiometer for MDL2 as above for MDL4 as above for MDL6
MDLPB2 MDLPB4 MDLPB6	card with 140 Ohm auxiliary potentiometer for MDL2 as above for MDL4 as above for MDL6



Actuators

Actuators for zone valves and terminal units

Series **MVA2** - Electrothermal type – For all 2 position SPST controllers: 200 Line see pages 4-5-9 and RT see page 22 - **for V.Z valve bodies**. Protection IP31.

Series **MVA4** - Electrothermal type - PWM (Pulse with modulation) Proportional and on-off 24 V a.c. - Driving signal from controllers 700 line, see page 22, DIGITROLL 7000 NR7312-7314-732xA-734xAA see page 25 - **for V.Z valve bodies**. Protection IP31.

Series **MVT4** - Bidirectional type - Driving signal from DIGITROLL 7000 NR732xB-734xBx, see page 25, RA733/734 see page 22 - **for V.T - V.BT valve bodies**. Protection IP43.

Series **MVT5/5A/55** - Bidirectional type with microprocessor module for proportional signal V dc and mA - **for V.T - V.BT valve bodies**. Protection IP40.

MODEL	INPUT SIGNAL	CONSUMPTION VA	OTHER CHARACTERISTICS
MVA21	110 to 230 V a.c.	5	with cable 1.5m
MVA23	110 to 230 V a.c.	5	without cable
MVA41	24 V a.c.	5	with cable 1.5m
MVA43	24 V a.c.	5	without cable
MVT4	three points 24 V a.c.	0.5	with 1.5 m plug in cable
MVT41	three points 24 V a.c.	0.5	without cable (see accessories)
MVT5	proportional 0 to 10; 1 to 5; 6 to 10; 2 to 10; 4 to 7; 6 to 9; 8 to 11 V d.c.	1	with cable
MVT5A	4 to 20 mA	1	1.5 m with cable 1.5 m
MVT55	0 to 10 V d.c.	1	1,5 m with cable 1,5 m

Accessories

D41	auxiliary switch for MVA 23 and MVA43
MVT4C1	standard cable 1,5 m for MVT41
MVT4C2	teflon cable 5 m for MVT41
37T	strap-on type summer/winter change over snap-point 18/30 °C - SPDT 5A - 220 V a.c. for ½ " pipe.

Valve bodies: see page 40

Globe valve actuators

Series **MVB** - Bidirectional motor for valve bodies VSB - VMB - VSB.F - VMB.F - VB7200 - VB7300 see pages 38-41 - Complete with linkage for mounting on valve body - Force 450 N. Protection IP50.

MODEL	TIMING s	SUPPLY V a.c.	CONSUMPTION VA	OTHER CHARACTERISTICS
MVB22	30	230	5	On-Off, floating
MVB26	65	230	5	
MVB28	420	230	5	
MVB46	65	24	5	
MVB36	65	24	5	with electronic card and 300 Ohm balance potentiometer (300 Line)
MVB52	30	24	5	with electronic card and 300 Ohm feed-back potentiometer range 6 to 9, 4 to 7, 8 to 11, 0 to 10, 2 to 10, 1 to 5 V d.c., 4 to 20 mA
MVB56	65	24	5	
MVB55	65	24	5	as above but only 0 to 10 V d.c
MVBAV	assembling MVB on valve bodies			

ATTENTION: Actuators are supplied NOT mounted on valve bodies. In case they are required assembled, the specific part number MVBAV must be listed on the order together with the models of actuator and valve body.

Series **SH** - Bidirectional motor for all valve bodies, stroke 10 to 45 mm. Complete with linkage for mounting on valve body. For VSB, VSB.F, VMB, VMB.F only add AG21 accessory (see pages 38, 41, 42). Force 12 Nm. Protection IP40.

MODEL	TIMING s	SUPPLY V a.c.	CONSUMPTION VA	OTHER CHARACTERISTICS
SH222	80	24	9	On-Off floating
SH242	80	230	9	On-Off floating
SH522	80	24	9	with electronic card ad 300 Ohm feed-back potentiometer , range 6 to 9, 4 to 7, 8 to 11, 0 to 10, 2 to 10, 1 to 5 V d.c., 4 to 20 mA
SH552	80	24	9	as above but only 0 to 10 V dc
SH2AV	Assembling SH on valve bodies.			

ATTENTION: Actuators are supplied NOT mounted on valve bodies. In case they are required assembled, the specific part number [SH2AV] must be listed on the order together with the models of actuator and valve body.

Valve bodies: see pages 41..45

Actuators

Globe valve actuators

Series **MVL** - For all valve bodies with self-adjusting stroke 10 to 45 mm - Complete with linkage for mounting on valve body - For VSB - VSB-F - VMB - VMB-F only add AG31 accessory, see pages 38...43 - Force MVL 1500 N, MVLA/C 700 N. Protection IP55.

Model	Timing (s) depending on valve stroke			Supply V a.c.	Consumption VA	Action	Other characteristics
	16.5	25	45				
MVL26	22	33	60	230	12	On-Off floating 230 V ac	-
MVL46	22	33	60	4	12	On-Off floating 24 V ac	-
MVL46A	22 (16)	33 (25)	60 (45)	24	12	On-Off floating 24 V ac	spring return stem up
MVL46C	22 (16)	33 (25)	60 (45)	24	12	On-Off floating 24 V ac	spring ret. stem down
MVL66	22	33	5	110	12	On-Off floating 110 V ac	-
MVL36	22	33	60	24	12	with electronic card and 300 Ohm balance potentiometer (300 Line)	-
MVL36A	22 (16)	33 (25)	60 (45)	24	12		spring return stem up
MVL36C	22 (16)	33 (25)	60 (45)	24	12		spring ret. stem down
MVL56	22	33	60	24	12	with electronic card and 300 Ohm feed-back potentiometer with range 4 to 7, 8 to 11, 0 to 10, 2 to 10, 1 to 5 V dc, 4 to 20 mA	-
MVL56A	22 (16)	33 (25)	60 (45)	24	12		spring return stem up
MVL56C	22 (16)	33 (25)	60 (45)	24	12		spring ret. stem down

MVLAV	assembling MVL on valve body
MVLMAV	assembling MVL A/C on valve body

Note: () Return time by spring return.
By spring return: **MVLA** stem-up, **MVLC** stem-down.

ATTENTION:

Actuators are usually supplied NOT mounted on valve bodies. In case actuators and valve bodies are required assembled, the specific part number MVLAV will have to be listed on the order together with the models of actuator and valve body, part number MVLMAV for actuators MVLA/C.

Accessories for actuators MVB - MVL - SH

MODEL	DESCRIPTION
D36	one end stroke auxiliary microswitch adjustable on the whole stroke for MVB
D5	one end stroke auxiliary microswitch adjustable for SH
DMVL	two auxiliary microswitches adjustable on the whole stroke for MVL
MVBPA2	1 kOhm auxiliary potentiometer for MVB46
P1000-1	1000 Ohm auxiliary potentiometer for SH
P140-1	140 Ohm auxiliary potentiometer for SH
MVLPa2	1000 Ohm auxiliary potentiometer for MVL26
MVLPa4	1000 Ohm auxiliary potentiometer for MVL46
MVLPa4M	1000 Ohm auxiliary potentiometer for MVL46A/C
MVLPa6	1000 Ohm auxiliary potentiometer for MVL66
MVLHT	Spacer for high temperature. To be used with valve bodies with fluid temp. higher than 150°C (SS, VSS, VBG, VBS, VMS, 3VAA, DS)

Valve bodies: see pages 41..45



Motorized valves

Motorized valves - 200 Line - On-Off

Series **S300** - NP 16 valve body - Rubber-gasketed plug - Female screwed connections - Fluid: water 5 to 95°C
On-Off unidirectional electric actuator - Manual override and position indication - Timing 40 s - Supply 230 V a.c.
Protection IP40



MODEL	SIZE	Kvs	MAX DIFF. PRESSURE kPa	OTHER CHARACTERISTICS
S2303	3/4"	6.3	300	TWO-WAY - cast-iron body
S2304	1"	10	200	
S2305	1 1/4"	16	140	
S2306	1 1/2"	25	100	
S2308	2"	40	60	
S3303	3/4"	6.3	300	THREE-WAY - cast-iron body
S3304	1"	10	200	
S3305	1 1/4"	16	140	
S3306	1 1/2"	25	100	
S3308	2"	40	60	

Accessory

D22	auxiliary microswitch SPDT 2(0.2)A - 250 V a.c.
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Series **VSM/VDM** - NP16 - Zone valves - On-Off - Timing: 12s, 3s (spring return) Manual override - Auxiliary microswitch * - Supply 230 V a.c. ** - Fluid water 2 to 95°C.



MODEL	SIZE	Kvs	MAX DIFF. PRESSURE kPa	OTHER CHARACTERISTICS
VSM1	1/2"	3,2	100	TWO-WAY - brass body
VSM2	3/4"	3,2	100	
VSM3	1"	6,8	100	
VDM1	1/2"	4,3	100	THREE-WAY diverting - brass body
VDM2	3/4"	4,6	100	
VDM3	1"	5,7	100	

* Closed when valve open.

** Also available 110 V a.c. - 24 V a.c.

Valve bodies

Valves bodies for zone and fan-coil units

Series **V.T.** - NP 16 forged brass valve body - Rubber gasketed plug. Equal-percentage flow characteristics.

To be motorized with actuator **MVT**, see page 37.

Series **V.Z** - NP 16 forged brass valve body - Rubber gasketed plug - Linear control flow characteristics

To be motorized with actuators **MVA**, see page 37.

MODEL	Kvs		MAX DIFFERENT PRESSURE kPa	TYPE		SCREWED CONNECTIONS		
	STRAIGHT-WAY	ANGLE-WAY				STRAIGHT-WAY	ANGLE-WAY	
VST09	0.25	-	350	two-way	n.c.	G 1/2" M	-	-
VST10	0.4	-	350		n.c.	G 1/2" M	-	-
VST11	0.6	-	350		n.c.	G 1/2" M	-	-
VST12	1	-	350		n.c.	G 1/2" M	-	-
VST13	1.6	-	350		n.c.	G 1/2" M	-	-
VST1	2.5	-	350		n.c.	G 1/2" M	-	-
VST21	2.5	-	250		n.c.	G 3/4" M	-	-
VST2	4	-	250		n.c.	G 3/4" M	-	-
VMT09	0.25	0.25	350	three-way	n.c.	G 1/2" M	G 1/2" M	-
VMT10	0.4	0.25	350		n.c.	G 1/2" M	G 1/2" M	-
VMT11	0.6	0.4	350		n.c.	G 1/2" M	G 1/2" M	-
VMT12	1	0.6	350		n.c.	G 1/2" M	G 1/2" M	-
VMT13	1.6	1	350		n.c.	G 1/2" M	G 1/2" M	-
VMT1	2.5	1.6	350		n.c.	G 1/2" M	G 1/2" M	-
VMT2	4	2.5	250		n.c.	G 3/4" M	G 3/4" M	-
VTT09	0.25	0.25	350	three-way four port	n.c.	G 1/2" M	-	-
VTT10	0.4	0.25	350		n.c.	G 1/2" M	-	-
VTT11	0.6	0.4	350		n.c.	G 1/2" M	-	-
VTT12	1	0.6	350		n.c.	G 1/2" M	-	-
VTT13	1.6	1	350		n.c.	G 1/2" M	-	-
VTT1	2.5	1.6	350		n.c.	G 1/2" M	-	-
VTT2	4	2.5	250		n.c.	G 3/4" M	-	-
VSZ09B	0.25	-	150	two-way	n.c.	G 1/2" M	-	-
VSZ10B	0.4	-	150		n.c.	G 1/2" M	-	-
VSZ11B	0.6	-	150		n.c.	G 1/2" M	-	-
VSZ11BA	0.6	-	150		n.o.	G 1/2" M	-	-
VSZ12B	1	-	150		n.c.	G 1/2" M	-	-
VSZ12BA	1	-	150		n.o.	G 1/2" M	-	-
VSZ13B	1.6	-	150		n.c.	G 1/2" M	-	-
VSZ13BA	1.6	-	150		n.o.	G 1/2" M	-	-
VSZ1B	2.5	-	150		n.c.	G 1/2" M	-	-
VSZ1BA	2.5	-	150		n.o.	G 1/2" M	-	-
VSZ21B	2.5	-	150		n.c.	G 3/4" M	-	-
VSZ21BA	2.5	-	150		n.o.	G 3/4" M	-	-
VSZ2B	4	-	100		n.c.	G 3/4" M	-	-
VSZ2BA	4	-	100		n.o.	G 3/4" M	-	-
VSZ3	4	-	100		n.c.	G 1" M	-	-
VMZ09B	0.25	0.25	150	three-way	n.c.	G 1/2" M	G 1/2" M	-
VMZ10B	0.4	0.25	150		n.c.	G 1/2" M	G 1/2" M	-
VMZ11B	0.6	0.4	150		n.c.	G 1/2" M	G 1/2" M	-
VMZ12B	1	0.6	150		n.c.	G 1/2" M	G 1/2" M	-
VMZ13B	1.6	1	150		n.c.	G 1/2" M	G 1/2" M	-
VMZ1B	2.5	1.6	150		n.c.	G 1/2" M	G 1/2" M	-
VMZ2B	4	2.5	150		n.c.	G 3/4" M	G 3/4" M	-
VMZ3B	4	2.5	150		n.c.	G 1" M	G 1" M	-
VTZ09B	0.25	0.25	150	three-way four port	n.c.	G 1/2" M	-	-
VTZ10B	0.4	0.25	150		n.c.	G 1/2" M	-	-
VTZ11B	0.6	0.4	150		n.c.	G 1/2" M	-	-
VTZ12B	1	0.6	150		n.c.	G 1/2" M	-	-
VTZ13B	1.6	1	150		n.c.	G 1/2" M	-	-
VTZ1B	2.5	1.6	150		n.c.	G 1/2" M	-	-
VTZ21B	2.5	1.6	150		n.c.	G 3/4" M	-	-
VTZ3B	4	2.5	150		n.c.	G 1" M	-	-

All above valve bodies can be supplied with NPT connections.



2-way single-seat, globe valve bodies

Series **VSB** - **VSB.F** - NP 16. To be motorized by **MVB** - **SH** - **MVL** actuators, see pages 37-38.



MODEL	SIZE inch mm	Kvs	STROKE mm	MAX DIFFER. PRESS. bar			OTHER CHARACTERISTICS
				MVB	SH-MVL	MVL A/C	
VSB11	½" R	1	16.5	2 (10)	2 (10)	2 (10)	- G 25 cast-iron body - internal parts in bronze - female screwed connections - fluid temp.: -10° to 120°C (-10 to 150°C with MVL actuator) - control flow characteristic: equal-percentage - leakage 0.03% Kvs - for MVL actuator add AG31 - for SH - ST actuators add AG21 - VSB8A linear control flow characteristic
VSB1	½" R	1,6		"	"	"	
VSB15	½" R	2,5		"	"	"	
VSB2	½"	4		"	"	"	
VSB3	¾"	6,3		"	"	"	
VSB4	1"	8		2 (6,5)	"	"	
VSB5	1 ¼"	16		2 (4)	"	"	
VSB6	1 ½"	22		2 (2,5)	2 (8)	2 (4)	
VSB8	2"	30	20	2	2 (6)	2 (3)	- VSB9F linear control flow characteristic
VSB8A	2"	40		2	2 (6)	2 (3)	
VSB11F	15 R	1		2 (10)	2 (10)	2 (10)	
VSB1F	15 R	1,6		"	"	"	
VSB15F	15 R	2,5		"	"	"	
VSB2F	15	4		"	"	"	
VSB3F	20	6,3		"	"	"	
VSB4F	25	8		2 (6,5)	"	"	
VSB5F	32	16	20	2 (4)	"	"	as above but with flanged connections NP16
VSB6F	40	22		2 (2,5)	2 (8)	2 (6)	
VSB8F	40	30		2	2 (6)	2 (6)	
VSB8AF	50	40		2	2 (6)	2 (8)	
VSB9F	65	63		1,6	2***	2	

() Max close-off differential pressure by closed valve.

* For applications free from icing on stem and packing.

** MVLA closed, MVLC open. *** motorized only with MVL



Series **VSBT** NP16 - To be motorized by **MVT** actuators, see page 37.

MODEL	SIZE inch	Kvs	STROKE mm	MAX DIFFER. PRESS. bar	OTHER CHARACTERISTICS
				MVT	
VSBT3	¾"	6,3	5,5	1,7	<ul style="list-style-type: none">- control flow characteristics linear- leakage 0,03% Kvs- fluid temp. 5° to 95°C
VSBT4	1"	10	5,5	1	
VSBT5	1 1/4"	13	5,5	0,7	
VSBT6	1 1/2"	16	5,5	0,5	

2-way bronze valve bodies

Series **VB7200** NP 16 – To be motorized by **MVB** and **MVL** actuators, see pages 37-38, **AG40** see page 46.



MODEL	SIZE inch	Kvs	STROKE mm	MAX DIFFER. PRESS. bar	OTHER CHARACTERISTICS
				MVB	
VB7225-02	½"	1,9	12,7	2 (10)	- NP 16 bronze body - internal parts in bronze Female G screwed connections fluid temp.: -7* to 138 °C - control flow characteristics: equal-percentage - Leakage: Straight-way: 0.01 % Kvs - By actuators MVB add AG40
VB7225-04	½"	3,8	12,7	"	
VB7225-06	¾"	6,5	12,7	"	
VB7225-08	1"	12	12,7	2 (6,5)	
VB7225-09	1 ¼"	17	12,7	2 (4)	
VB7225-10	1 ½"	24	12,7	2 (2,5)	
VB7225-11	2"	35	12,7	2 (2)	

() Max close-off differential pressure by closed valve.

* For applications free from icing on stem and packing

Valve bodies

2-way single-seat, globe valve bodies

Series **VSG - SS** - To be motorized by **SH - MVL** actuators, see pages 34-35, and ST402, see page 12.



MODEL	SIZE mm	Kvs	STROKE mm	MAX DIFFER. PRESS. bar			OTHER CHARACTERISTICS
				SH-ST	MVL	MVL ** A/C	
VSG (NP 16)	25 R	4	16,5	2 (10)	2 (10)	2(10)	<ul style="list-style-type: none"> - G 25 cast-iron body internal parts in bronze NP 16 flanged connections fluid temp.: - 10* to 150 °C - control flow characteristics equal-percentage - leakage 0.03% Kvs
	25 I	6,3	"	"	"	"	
	25	10	"	"	"	"	
	40	20	25	2(7,5)	2(9,5)	2(3,5)	
	50	32	"	2(6)	2(6)	2(2,4)	
	65	63	"	2(3,6)	2(2,3)	0,8	
	80	100	45	2(1,7)	1,4	0,4	
	100	130	"	0,8	1,4	0,4	
SSGA (NP 16)	15 R	1,6	16,5	6(16)	6(16)	6(16)	<ul style="list-style-type: none"> - G 25 cast-iron body internal parts in stainless steel NP 16 flanged connections fluid temp.: - 10* to 200 °C - control flow characteristics equal-percentage - leakage 0,02% Kvs
	15	4	"	"	"	"	
	20	6,3	"	"	"	6(14)	
	25	10	"	"	"	6(9)	
	32	16	25	"	"	"	
	40	22	"	6(10)	6(13,3)	5,5	
	50	32	"	6(7)	6(9)	3,5	
	65	63	"	2,5	3,5	1,4	
VSS (NP 25)	80	110	45	1,5	2,3	0,9	<ul style="list-style-type: none"> - G 308 cast-iron body internal parts in stainless steel NP 25 flanged connections fluid temp.: -10* to -230°C - control flow characteristics equal-percentage - leakage 0,02% Kvs
	100	140	"	1	1,4	0,5	
	25 R	4	16,5	8(16)	8(20)	7(10)	
	25 I	6,3	"	"	"	"	
	25	10	"	"	"	"	
	32	16	25	7,5(10)	8(13)	5,5	
SSAA (NP 40)	40	25	"	7	7,5(9)	4	<ul style="list-style-type: none"> - Fe 52 cast-steel body internal parts in stainless steel NP 40 flanged connections fluid temp.: - 10* to 230 °C - control flow characteristics equal-percentage - leakage 0,02% Kvs
	50	40	"	5	6,3	2,5	
	65	63	"	2,7	3,5	1,4	
	15 R	1,6	16,5	6(16)	10(30)	10(30)	
	15	4	"	"	"	10(20)	
	20	6,3	"	"	"	10(12)	
	25	10	"	"	10(20)	7,5	
	32	16	25	"	"	7,5	
	40	22	"	6(10)	10(13)	4,3	
	50	32	"	6(7)	8	2,8	
SSAACP *** (NP 40)	65	70	"	2,5	3,5	1	<ul style="list-style-type: none"> - Fe 52 cast-steel body with extension cooling internal parts in stainless steel with grease-cap and special sealings for high temperature NP 40 flanged connections fluid temp.: - 20*** to 350°C - control flow characteristics equal-percentage - leakage 0,02% Kvs
	80	110	45	1,5	2,3	0,8	
	100	140	45	0,8	1,4	0,4	
	15 R	1,6	16,5	6(16)	10(30)	10(30)	
	15	4	"	"	"	10(20)	
	20	6,3	"	"	"	10(12)	
	25	10	"	"	10(20)	7,5	
	32	16	25	"	"	7,5	

() Max close-off differential pressure by closed valve.

* For applications free from icing on stem and packing.

** VSG-VSS: by spring return MVLA closed, MVLC open.

SS: by spring return MVLA open, MVLC closed.

*** Fluid applications < -10 °C by ordering add. "B" to model, by ex. SSAACP40B.

Options for valve bodies: see page 46.

2-way balanced seat valve bodies

Series **VBS - VBG**. To be motorized by **SH-MVL** actuators, see pages 37-38, and ST402, see page 12.

MODEL	DN	Kvs	STROKE mm	MAX. DIFF. PRESS. bar			OTHER CHARACTERISTICS
				SH-ST	MVL	MVL** A/C	
VBS (PN 25)	25 R	4	16,5	7 (25)	7 (25)	7 (25)	- G308 spheroidal cast-iron body internal parts stainless steel NP 25 flanged connections fluid temp.: -10* to 230°C - control flow characteristics equal percentage - leakage 0,02% Kvs
	25	6,3	"	"	"	"	
	25	10	"	"	"	7 (23,5)	
	32	16	25	"	"	7 (16,5)	
	40	25	"	"	"	7 (10)	
	50	40	"	"	"	"	
VBG (PN 16)	80	100	45	2 (16)	2 (16)	2 (10)	- G25 cast-iron body internal parts in bronze NP 16 flanged connections fluid temp.: -10* to 150°C - control flow characteristics equal percentage - leakage 0,03% Kvs
	100	130	"	2 (16)	2 (16)	2 (8)	
	125	200	"	2 (13,5)	2 (16)	2 (5,5)	
	150	300	"	2 (10,5)	2 (14,5)	2 (4,5)	



2-way double-seat globe valve bodies

Series **DS** - To be motorized by **SH - MVL** actuators, see pages 37-38.

MODEL	SIZE mm	Kvs	STROKE mm	MAX DIFFER. PRESS. bar		OTHER CHARACTERISTICS
				SH-MVL	MVL *** A/C	
DSGA (NP 16)	32 R	10	16,5	8 (16)	8 (16)	- G 25 cast-iron body internal parts in stainless steel NP 16 flanged connections fluid temp.: -10* to 200 °C - control flow characteristics equal-percentage - leakage 0,12 % Kvs
	32	16	"	"	"	
	40	22	25	"	"	
	50	32	"	"	"	
	65	63	"	"	"	
	200	500	"	8 (9)	-	
DSAA (NP 40)	32 R	10	16,5	12 (30)	12 (30)	- Fe 52 cast-steel body internal parts in stainless steel NP 40 flanged connections fluid temp.: - 10* to 230 °C - control flow characteristics equal-percentage - leakage 0,12 % Kvs
	32	16	"	"	"	
	40	22	25	"	"	
	50	32	"	"	"	
	65	63	"	"	12 (14)	
	80	85	"	"	11	
	100	160	45	12 (20)	8,5	
	125	200	"	"	8	
DSAACP (NP 40)	150	300	"	12 (14)	7	- Fe 52 cast-steel body with extension cooling, internal parts in stainless steel with grease-cap and special sealings for high temperature NP 40 flanged connections fluid temp.: - 20***to 350 °C - control flow characteristics equal-percentage - leakage 0,12 % Kvs
	32 R	10	16,5	12 (30)	12 (30)	
	32	16	"	"	"	
	40	22	25	"	"	
	50	32	"	"	"	
	65	63	"	"	12 (14)	
	80	85	"	"	11	
	100	160	45	12 (20)	8,5	
	125	250	"	"	8	
	150	300	"	12 (14)	7	



() Max close-off differential pressure by closed valve.

* For applications free from icing on stem and packing.

** By spring return VBG and VBS MVL close, MVLC open, DS MVL open, MVL close

*** Fluid applications < -10 °C by ordering add. "B" to model, by ex. DSAACP40B.

Options for valve bodies: see page 46.

CONTROLLI

Valve bodies

3-way single-seat, globe valve bodies

Series **VMB - VMBF** - NP 16. To be motorized by **MVB - SH - MVL** actuators, see pages 37-38.



MODEL	SIZE inch mm	Kvs	STROKE mm	MAX DIFFER. PRESS. bar			OTHER CHARACTERISTICS
				MVB	SH-MVL	MVL ** A/C	
VMB11	½" R	1	16,5	2 (10)	2 (10)	2 (10)	- G 25 cast-iron body - internal parts stainless steel - NP 16 flanged connections - fluid temp.: -10* to 120°C (-10 to 150°C with MVL actuator) - control flow characteristics equal-percentage - leakage 0.03% Kvs - for MVL actuator add AG31 - for SH - ST actuators add AG21 VMB8A linear control flow characteristics
VMB1	½" R	1,6		"	"	"	
VMB15	½" R	2,5		"	"	"	
VMB2	½" R	4		"	"	"	
VMB3	¾"	6,3		"	"	"	
VMB4	1"	8		2 (6,5)	"	"	
VMB5	1 ¼"	16		2 (4)	"	"	
VMB6	1 ½"	22		2 (2,5)	2 (8)	2 (4)	
VMB8	2"	30		2	2 (6)	2 (3)	
VMB8A	2"	40		2	2 (6)	2 (3)	
VMB11F	15 R	1	16,5	2 (10)	2 (10)	2 (10)	as above but with flanged connections NP16
VMB1F	15 R	1,6		"	"	"	
VMB15F	15 R	2,5		"	"	"	
VMB2F	15	4		"	"	"	
VMB3F	20	6,3		"	"	"	
VMB4F	25	8		2 (6,5)	"	"	
VMB5F	32	16		2 (4)	"	"	
VMB6F	40	22		2 (2,5)	2 (8)	2 (6)	
VMB8F	50	30		2	2 (6)	2 (8)	
VMB8AF	50	A0		2	2 (6)	2 (8)	
VMB9F	50	63	20	1,6	2***	2	VMB9F linear control flow characteristics

() Max close-off differential pressure by closed valve.

* For applications free from icing on stem and packing.

** MVL closed, MVL open. *** motorized only with MVL

Series **VMBT** NP 16 - To be motorized by **MVT** actuators, see page 37.



MODEL	SIZE	Kvs	STROKE mm	MAX. DIFFER. PRESS. bar MVT	OTHER CHARACTERISTICS
VMBT3	¾"	6.3	5.5	1.7	- control flow characteristics linear - fluid temp.: 5 to 95°C
VMBT4	1"	10	5.5	1	
VMBT5	1 ¼"	13	5.5	0.7	
VMBT6	1 ½"	16	5.5	0.5	

3-way bronze valve bodies

Series **VB7300** - NP 16 - To be motorized by **MVB** actuators, see page 37, **AG40** see page 46.



MODEL	SIZE inch	Kvs	STROKE mm	MAX DIFFER. PRESS. bar	OTHER CHARACTERISTICS
				MVB	
VB7315-02	½"	1,9	12,7	2 (10)	- NP 16 bronze body - internal parts in bronze Female G screwed connections fluid temp.: -7* to 138 °C - control flow characteristics: linear - Leakage: Straight-way: 0.2 % Kvs - By actuators MVB add AG40
VB7315-04	½"	3,8	12,7	"	
VB7315-06	¾"	6,5	12,7	"	
VB7315-08	1"	12	12,7	2 (6,5)	
VB7315-09	1 ¼"	17	12,7	2 (4)	
VB7315-10	1 ½"	24	12,7	2 (2,5)	
VB7315-11	2"	35	12,7	2 (2)	

() Max close-off differential pressure by closed valve.

* For applications free from icing on stem and packing.

3-way valve bodies

Series **VM - 3V - To be motorized by MVL - SH actuators**, see page 37-38, and ST402, see page 12.

MODEL	SIZE mm	Kvs	STROKE mm	MAX DIFFER. PRESS. bar			OTHER CHARACTERISTICS
				SH - ST	MVL	MVL ** A/C	
VMB16 (NP 16)	25 R	4	16,5	2 (10)	2 (10)	2 (8)	<ul style="list-style-type: none"> - G 25 cast-iron body - internal parts in bronze - NP 16 flanged connections - fluid temp.: - 10° to 150 °C - control flow characteristics - straight-way: equal-percentage - angle way: linear - leakage: straight-way: 0.03% Kvs - angle way: 2% Kvs
	25 I	6,3	"	"	"	"	
	25	10	"	"	"	"	
	40 R	19	25	2 (8)	"	2 (4)	
	40	25	"	"	"	"	
	50	32	"	2 (5)	2 (6.7)	2 (2.6)	
	65	63	"	2 (3)	2 (4)	1.5	
	80	100	45	1,8	2(2.4)	0.9	
	100	130	"	1	1.5	0.5	
3VGA (NP 16)	125	200	"	0.6	0.9	0.25	<ul style="list-style-type: none"> - G 25 cast-iron body - internal parts in stainless steel - NP 16 flanged connections - fluid temp.: -10° to 200 °C - control flow characteristics: linear - leakage 0.02% Kvs
	150	300	"	0.4	0.5	0.15	
VMS (NP 25)	25 R	4	16,5	16(16)	6(16)	6(9)	<ul style="list-style-type: none"> - G-308 spheroidal cast-iron body - internal parts in stainless steel - NP 25 flanged connections - fluid temp.: -10° to 230°C - Control flow characteristics: linear - leakage 0.02% Kvs
	25 I	6,3	"	"	"	"	
	25	10	"	"	"	"	
	32	19	25	6(10)	6(14)	5,5	
	40	25	"	6(7)	6(9)	3,5	
3VSA (NP 25)	50	40	"	5	6	2,5	<ul style="list-style-type: none"> - Control flow characteristics: linear - leakage 0.02% Kvs
	65	63	"	2,5	3,5	1,4	
	80	100	45	1,5	2	0,8	
VMSTS (NP 25)	25 R	4	16,5	6	6	6	<ul style="list-style-type: none"> - G 308 spheroidal cast-iron body - internal parts in stainless steel - with bellows seal - NP 25 flanged connections - fluid temp.: -10° to 300 °C - control flow characteristics: linear - leakage 0,02% Kvs
	25 I	6,3	16,5	5	5	5	
	25	10	"	"	"	"	
	32	19	25	"	"	4	
	40	25	"	"	"	2,5	
	50	40	"	"	"	1,5	
3VSATS (NP 25)	65	63	"	2,5	3	1	<ul style="list-style-type: none"> - control flow characteristics: linear - leakage 0,02% Kvs
	80	100	45	1,5	2	0,5	
3VAA (NP 40)	25 R	4	16,5	6(16)	10(20)	7,5	<ul style="list-style-type: none"> - Fe 52 cast-steel body - internal parts in stainless steel - NP 40 flanged connections - fluid temp.: -10° to 230 °C - Control flow characteristics: linear - leakage 0,02% Kvs
	25 I	6,3	"	"	"	"	
	25	10	"	"	"	"	
	32	16	25	6(10)	10(13)	4,5	
	40	22	"	6(7)	8,5	3	
	50	32	"	5	5,5	2	
	65	70	"	2,5	3,5	1	
	80	110	45	1,5	2	0,7	
3VAACP ** (NP 40)	100	140	"	-	1,3	0,4	<ul style="list-style-type: none"> - Fe 52 cast-steel body with extension cooling - internal parts in AISI 316 stainless steel with grease-cap and special sealings for high temperature - NP 40 flanged connections - fluid temp.: - 20*** to 350 °C - control flow characteristics: linear - leakage 0,02% Kvs
	125	250	"	-	0,8	0,2	
	25 R	4	16,5	6(16)	10(20)	6,8	
	25	10	"	"	"	6,8	
	32	16	25	6(10)	10(12)	4,3	
	40	22	"	6(7)	8	2,8	
	50	32	"	5	5,5	2	
	65	70	"	2,5	3,5	1	
	80	110	45	1,5	2	0,7	<ul style="list-style-type: none"> - control flow characteristics: linear - leakage 0,02% Kvs
	100	140	"	-	1,3	0,4	
	125	250	"	-	0,8	0,2	



() Max close-off differential pressure by closed valve.

* For applications free from icing on stem and packing.

** By spring return: MVLA closed straight-way, MVLC open

*** Fluid applications < -10 °C by ordering add. "B" to model, by ex. 3VAACP40B

Options for valve bodies see page 46.

Valve bodies

Options valve bodies

MODEL	OTHER CHARACTERISTICS
A125-2	flanges ANSI 125 for SSGA and DSGA valves
A125-3	flanges ANSI 125 for 3VGA valves
A150-2	flanges ANSI 150-RF for SSAA and DSAA valves
A150-3	flanges ANSI 150-RF for 3VAA valves
A300-2	flanges ANSI 300 for SSAA and DSAA valves
A300-3	flanges ANSI 300 for 3VAA valves
244	stem heater for valve VSB/VSB-F- VMB/VMB-F motorized with MVB, supply 24 V a.c.
245	as above for valves SS-VSG-DS-VM-3V-VBG-VBS motorized SH, ST, MVL supply 24 V a.c.
246	as above for valves VSB/VSB-F- VMB/VMB-F, motorized with SH, MVL - supply 24 V a.c.

Accessories for assembling actuators to valve bodies

Series **MVB - MVL - SH - ST** actuators are already fitted with linkage. When necessary the following accessories are available.

AG21	for mounting SH - ST on VSB - VSB-F - VMB - VMB-F (pages 41, 44)
AG23	for mounting MVB on Cazzaniga/TA valve body
AG31	for mounting MVL on VSB - VSB-F - VMB - VMB-F (page 41, 44)
AG35	for mounting MVL on VB7225/7315 bronze valve (page 41, 44)
AG40	for mounting MVB on VB7225/7315 bronze valve (page 41, 44)

Valve bodies
Butterfly valve bodies

Series **VF** - To be motorized by: **ST 404/405**, see page 12 or **MDL/AF**, see pag 36.

MODEL	SIZE	Kvs	MAX DIFFERENTIAL PRESSURE kPa WITH ACTUATORS ST 405 and MDL	OTHER CHARACTERISTICS
VFG10 (NP 10)	40	85	200	<ul style="list-style-type: none"> - G 25 cast-iron valve body connections: flangeless wafer butterfly for UNI NP 10 flanges fluid temp.: 120 °C max - leakage: 0.3% Kvs
	50	130	200	
	65	220	200	
	80	340	200	
	100	550	150	
	125	900	100	
	150	1400	70	
	200	2500	40	


Linkages and assembling for butterfly valves with actuators MDL

AF22	linkage and strain release mechanism with position indicator
MDLAV	assembly MDL on the VFG 10 valve

Shoe valve bodies

Series **M** - Cast-iron NP 6 - To be motorized by: **ST 404/405** actuators fitted with **AM** linkage, see page 12.

MODEL	SIZE	Kvs	MAX DIFFERENTIAL PRESSURE kPa WITH ACTUATORS: ST404 / ST 405	Construction (for connection type)	OTHER CHARACTERISTICS
M3 (NP 6)	1"	16	100	AM52	-THREE-WAY NP 6 cast-iron valve body female screwed connections output from angle-way fluid temp.: 110 °C max
	1¼"	25	100	AM52	
	1½"	40	100	AM52	
	2"	63	100	AM52	
M3 (NP 6)	40	40	100	AM44	as above but flanged connections
	50	63	100	AM52	
	65	100	80	AM52	
	80	160	50	AM52	
	100	250	30	AM52	
M4 (NP 6)	1"	16	100	AM52	FOUR-WAY NP 6 cast-iron valve body female screwed connections fluid temp.: 110 °C max
	1¼"	25	100	AM52	
	1½"	40	100	AM52	
	2"	63	100	AM52	
M4 (NP 6)	50	63	100	AM52	as above but flanged connections
	65	100	80	AM52	
	80	160	50	AM52	
	100	250	30	AM52	


Linkages for shoe valves

Series **AM** - Linkages and strain release mechanism for M3 - M4 valves.

AM44	for valves M3 size 40 mm
AM52	for all M3 and M4 valves but M3 DN40

CONTROL VALVES SIZING

HOW TO CALCULATE KVs

Flow coefficient KVs is the quantity of water in m³/hr which goes through the valve, when fully open, by pressure drop of 1 kg/cm².

Data:

- quantity of fluid that the valve must supply to the systems (m³/hr)
- valve inlet pressure (bar)

- Design the pressure drop through the valve,
- Calculate the KVs necessary for the valve:

$$a) \text{ water KVs} = \frac{Q \cdot 10}{\sqrt{\Delta p_v}}$$

Q = flow (m³/hr)

Δp_v = pressure drop (kPa)

$$b) \text{ saturated steam KVs} = \frac{QC \cdot 10}{22.7 \sqrt{P_2 \Delta p}}$$

Q = flow (kg/hr)

C = 1 + 0,0013 (t - t_s)

t = steam temperature in working conditions

t_s = saturated steam temperature at pressure P₂

P₂ = outlet pressure (kPa)

Δp = pressure drop (kPa)

Choose the valve with the KVs closest to the calculated one.

PRACTICAL SUGGESTIONS FOR PRESSURE DROP SELECTION.

WATER SYSTEM

Two-way valve

For this application, pressure drop through the valve must be high in order to have a good control flow characteristic and a properly working system.

- 1) Pressure drop of valves must be 30 to 50% of pressure drop of systems.
- 2) Pressure drop of valves must be equal to, or higher than pressure drop of battery or heat exchanger under control, more precisely:

temperature drop of heat exchanger

30 °C

20 °C

10 °C

design pressure drop of valves

equal to pressure drop of heat exchanger

twice as pressure drop of heat exchanger

three times as pressure drop of heat exchanger

3-way mixing valve

For mixing valve a high pressure drop is not normally required even when used in primary and secondary water to control supply temperature to users.

As a general rule the valve must have a pressure drop similar to that one of heat exchanger.

3-way diverting valve

3-way diverting valves are used to control flow to heat exchanger and therefore pressure drop through valve, for proportional systems, must be high.

Note: When selecting pressure drop you must not exceed the above mentioned values because a valve that is too small could produce:

- noisy operation and vibration of the plug
- accelerated wear of the plug and seat due high velocity of fluid through the valve.

SUPERHEATED WATER SYSTEM

For this application the used valves are two or three-way types.

Pressure drop of valve must be high, in order to have a good control flow characteristic and a properly working system.

The principles and rules for correct sizing are as per "WATER SYSTEMS".

STEAM SYSTEM

For low pressure steam systems (up to 2 bar), pressure drop through the valve must be 60 to 80% of pressure available at valve inlet.

steam pressure valve inlet

0.5 bar 50 kPa,

1.0 bar 100 kPa

valve pressure drop

40 kPa

70 kPa

For high pressure steam systems (above 2 bar) pressure drop through the valve must be 30 to 40% of pressure available at valve inlet.

steam pressure valve inlet

200 kPa

600 kPa

1000kPa

valve pressure drop

80 kPa

200 kPa

300 kPa

For two-position valves there are no particular rules to follow, pressure drop may be 10 to 20 % of inlet pressure, but valve is normally pipe sized.

Note: Do not size valve for high pressure steam with pressure drop higher than 50% of absolute available pressure, beyond this percentage thermodynamic problems could affect valve efficiency and life.

THERMAL OIL SYSTEMS

The commonest valve type used is three-way with linear characteristics in order to assure a constant flow to boiler by constant speed.

Two-way valves can be utilized for several low-power users and where a balancing valve is mounted between supply and return boiler.

Pressure drop of three-way valve must be at least equal to or higher than that one of heat exchanger.

For a single user control valve must have a pressure drop 30 to 50% of pressure drop of system.

For two-way valves see the "WATER SYSTEMS" section.

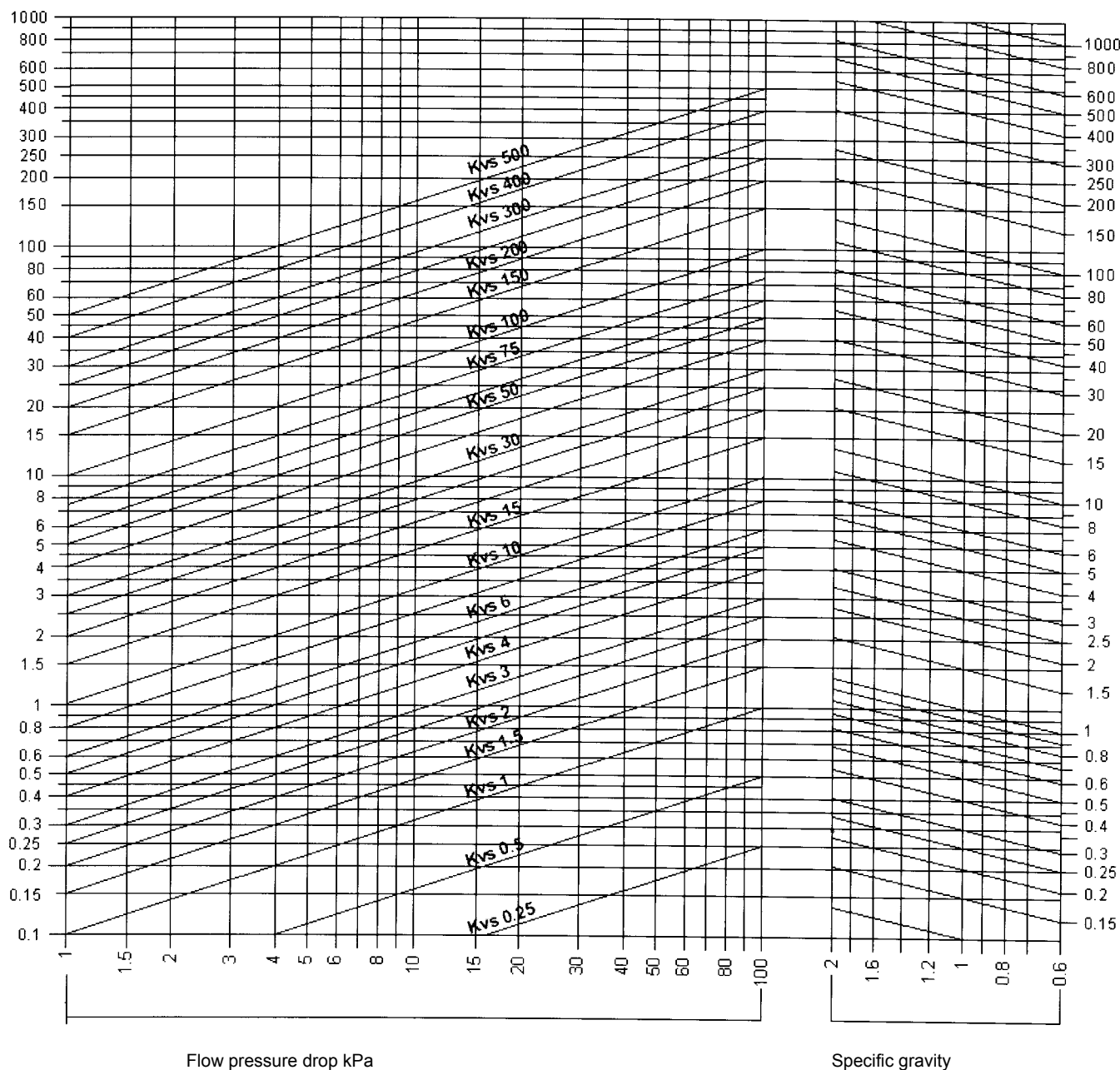
FOR FLUIDS

FLOW liquid with
specific gravity 1 kg/d³
m³/h

$$Kvs = \frac{Q \cdot 100}{\sqrt{\Delta p v}}$$

Q = flow m³/h
Δpv = pressure drop (kPa)

FLOW liquid with specific gravity 1 kg/d³
different than 1 kg/dm³
m³/h



Flow pressure drop kPa

Specific gravity

(100 kPa = 1 bar = ~ 10 m H₂O)

Example for fluids with specific gravity 1 kg/dm³ (water)

FLOW : 7.5 m³/h water
PRESSURE DROP : 55 kPa

– Locate the crossing point between the line with starting point at flow value 7.5 m³/h and the line at pressure drop value 55 kPa.

This point corresponds to flow coefficient Kvs 10, therefore control valve must have Kvs = 10.

Example for fluids with specific gravity different than 1 kg/dm³

FLOW : 30 m³/h fluid with specific gravity 0.9 kg/dm³
PRESSURE DROP : 20 kPa

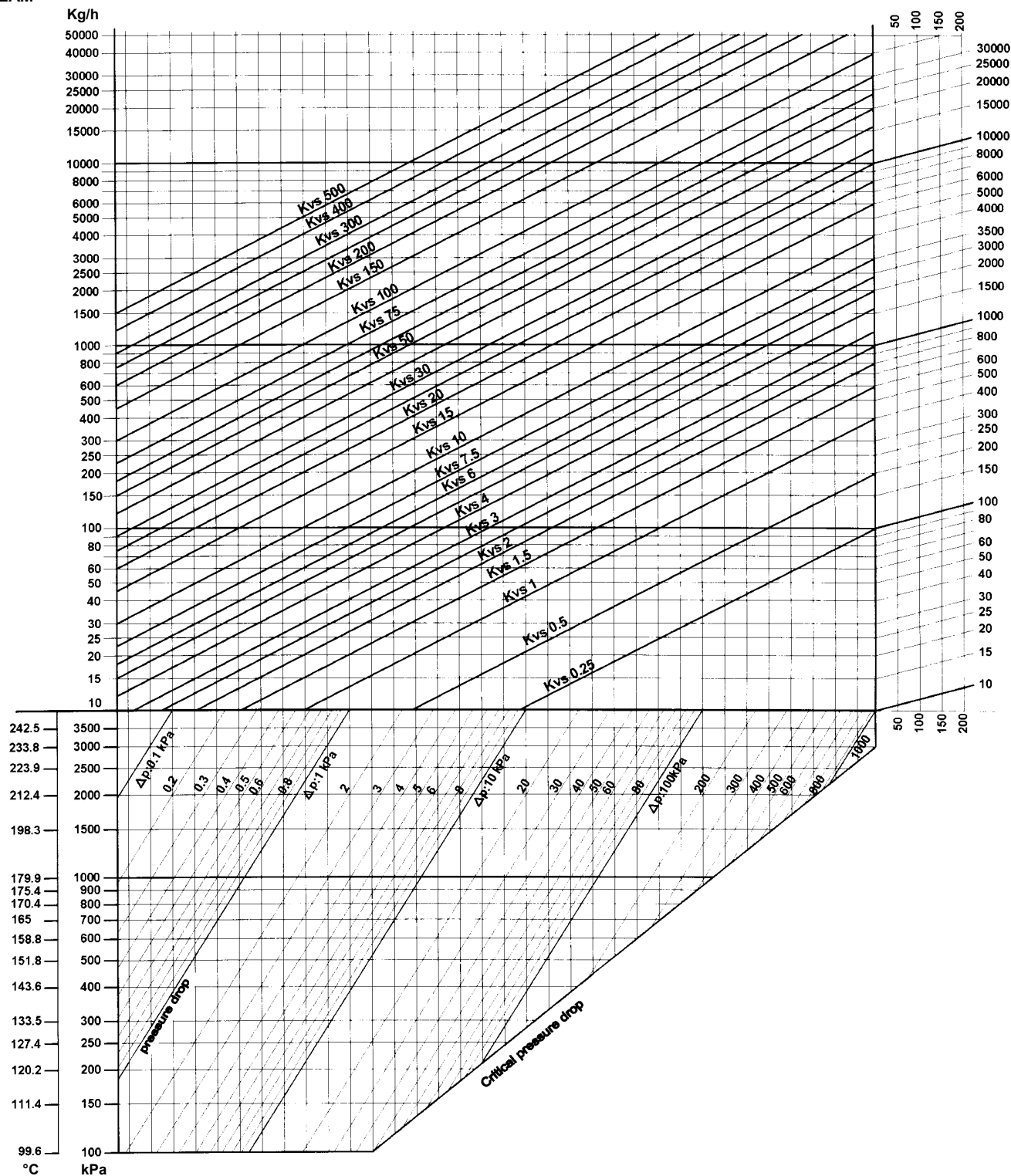
– Locate the crossing point (right side of diagram) between the line with starting point at specific gravity value 0.9 kg/dm³ and the sloping line at flow value 30 m³/h.

– Locate the crossing point between the line with starting point at above crossing point and the line at pressure drop value 20 kPa.

This point corresponds to flow coefficient Kvs 63, therefore control valve must have size Kvs = 63 (DN65).

CONTROL VALVES SIZING

FOR STEAM



Example for saturated steam:

FLOW : 4700 kg/h saturated steam
ABSOLUTE INLET PRESSURE: 850 kPa
PRESSURE DROP : 160 kPa

- Locate the crossing point between the line with starting point at absolute inlet pressure 850 kPa and the sloping line of 160 kPa pressure drop.
- Locate the crossing point between the line with starting point at above crossing point and the line of 4700 kg/h flow.

This point corresponds to flow coefficient Kvs 63, DN 65, therefore control valve must have size 65 mm,

Example for superheated steam:

FLOW : 140 kg/h superheated steam
ABSOLUTE INLET PRESSURE : 350 kPa
TEMPERATURE : 209 °C
PRESSURE DROP : 100 kPa

Calculate the superheating degree as follows:

- Read the temperature value corresponding to 350 kPa (139 °C)
Superheating degree - 209 - 139 = 70 °C
- Locate the crossing point (right side of diagram) between the line with starting point at superheating 70 °C and the sloping line of 140 kg/h flow.
- Locate the crossing point between the line with starting point at 350 kPa inlet pressure and the sloping line at 100 kPa pressure drop.
- Locate the crossing point between lines with starting points.

This point corresponds to flow coefficient Kvs 4.

MODELS IN ALPHABETICAL ORDER

A	PAGE		PAGE		PAGE	Y	PAGE
A1 to 4	5, 7	MDLS5	36	SPC	10	Y100/101	5
A125/150/300	46	MDLV5	36	SSAA	42	Y110/110RM	4
AF22	47	MDLPA-MDLPB	36	SSAACP	42	YS7	35, 36
AG	46	MM501	19	SSGA	42	YTC3 - YTC3RM	5
AM	47	MVA	37	ST2AV-ST5AV	12	YZB	4
AS202A/204A	4	MVB22/26/28/36/46	37	ST402/404/405	12		
AX212A/214A/235	9	MVB52/55/56	37	STA42	23		
AX526	17	MVBAV	37	STA71	22-26	2	
		MVBPA2	38	STA75/75S	26	244 to 246	43
		MVL	38	STA77/78/79	22		
		MLA/C	38	STA80/80S/81	26	3	
B		MVLAV-MVLMAV	38	STR71	23-26	3VAA	45
B301 to 304	5	MVLHT	38	STR72	22	3VAACP	45
B301X to 304X	5	MVLP2/PA4/PA6	38			3VGA	45
B351 to 354	7	MVT	37	T		3VSA	45
B351X to 354X	7	MW1 - MW2	19	T4-20	10	3VSATS	45
BD295	5	MWD1 - MWD2	19	TL51	20	37T	37
				TPC	10		
C		N		TPC-2	10	4	
C306 to 310	4	NC7311	25	TP-C3.	34	421	10, 18
C306S	4	NR7000	25, 26	TP-D3.	34		
C356 to 360	7	NS71 to 74	26	TQ-A31	34		
C356S	7			TT-A21/31	34		
CM350	7			TT-C21/22/31	34		
CM511	20	P		TT-C23-24	34		
CP8551/8552	19	P140-1	38	TT-D21/31	34		
CX228	9	P1000-1	38	TT-E21/31	34		
CX528	10			TU-A-TU-D	34		
		R		TUTA-TUTD	34		
D		R1	4-7	TX283	9		
D5	35, 38	RA715/725/733/734	22	TX581/586	10		
D22	39	RK4113	14			U	
D36	38	RKA11/41	14	UF215/216	4		
D41	37	RM51 to 54	20			V	
D77	12	RM77	14, 26	VB7225	41		
DG2000	31	RM77S	26	VB7315	41		
DIGISTAT	9	RM222	23	VBG	43		
DMDL	36	RP4102	14	VBS	43		
DMVL	38	RT222	23	VDM	39		
DSAAA	43	RT244	23	VFG10	47		
DSAACP	43	RT715/716/725	22	VMB - VMB-F-VMBT	44		
DSGA	43	RX513/515/517	17	VMB16	45		
				VMS	45		
F		S		VMSTS	45		
F1	11	S1-1	35	VMT-VST-VTT	40		
FG600	5	S2-2	35	VMZ-VSZ-VTZ	40		
FG650	7	S2/3 303 to 308	39	VSF - VSB-F-VSBT	41		
		S10	35	VSG	42		
G		S24H60	35	VSM	39		
G1	4-7	SB246	35	VSS	42		
G4	4-7	SBA	18			W	
GS541/2/3	19	SBA20/55	18	WD542/544	19		
		SBC	14, 18	WE593	18		
I		SBD	18	WF594	17		
IZA - IZB - IZV	20	SBE	14, 18	WH272	18		
		SBF	14	WH572/574	18		
K		SBV	18	WM551 to 555/557	17		
KG8	35	SH222/242	37	WP562	19		
KH8	35	SH225/245	35	WQ533	19		
KX435G/S - 436G/S	11	SH2AV	37	WS506	19		
		SH522/552	37	WT223/225	17		
M		SH525	35	WT513/515	17		
MDL20/30/40/50/60	36	SM225/245	35	WT533/535	17		
MDLA	36	SM526	35	WT543/544	17		
MDLAV	47	SMR226/246	35	WT755/576	22		
		SMR226S/246S	35	WV511/539	18		
		SMR526	35				
		SNC - SNE - SNF	11				

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FOUNDATION AND DEVELOPMENT

ACTIVITY

CONTROLLI was established in Genoa in 1936 and was the first Italian producer to supply a complete range of controllers, actuators and control valves for heating and air-conditioning systems.

After World War II the product range was improved by control equipment and systems for industrial application. CONTROLLI expansion is steady thanks to acquisition and exploitation of advanced technologies, updating of production services and improvement of both distribution and customer service network.

In the eighties CONTROLLI consolidates its position as the most important national manufacturer, with special regard to environmental comfort, thanks to the development of analogue and digital electronic devices.

In the nineties CONTROLLI gains a position also in the Building Automation market.

Since 1996 CONTROLLI is part of INVENSYS, a multinational group incorporating over 370 companies worldwide.

In 2001 the company name became Invensys Controls Italy S.r.l.

Among the group most important companies are FOXBORO, RANCO S.E.C., SATCHWELL, ROBERT-SHAW, ERIE, INVENSYS CLIMATE CONTROL, EBERLE, GESTRA, etc.

RESEARCH & DEVELOPMENT MANAGEMENT

CONTROLLI devices are the product of mechanical - electrical- electronical-technology integration. Originality and validity of each project are assured by the constant updating of R & D Dep. with reference to the most advanced technological researches in the world and by a sixty-year experience in the field.

Market analysis, users' requirements interpretation, project through information engineering support, experimenting with products and components through high-tech lab equipment and pilot plants; this all results in any new project.

PRODUCTION MANAGEMENT

An industrial complex of 8000 m² in Sant'Olcese (Genoa) is CONTROLLI's head office. Production is highly automated. Robotic devices assemble and calibrate mechanical and electronic spare parts and finished products.

It is worth mentioning the robotic plant for processing, assembly and testing of valve bodies and the robotized work-cell for assembly, testing and certification of fan-coil valves actuators. CONTROLLI vauches for its productive quality level and since 1994 operates under Quality Certificate System ISO9002.

SALES AND MARKETING MANAGEMENT

Sales & Marketing Dept. is in Sant'Olcese (Genoa).

Italian sales network consist of Sales-Offices in Milan, Genoa and Rome, more than 40 representatives and 60 authorized dealers throughout the national territory.

Abroad CONTROLLI operates through a widespread network of distributors and dealers.

By getting in touch with the nearest CONTROLLI sales point customers can find a solution to any technical and commercial inquiry.

A proper service of TECHNICAL ASSISTANCE supplies the support for systems and devices application inquiries, quotations and wiring diagrams.

CONTROLLI holds periodically training courses for different levels of technical expertise and class of customers.