SIEMENS

ACVATIX™

Rotary actuators for ball valves

GMA..9E..

Electromotive rotary actuators with spring return for fail-safe function on 2-position, 3-position, and modulating control. Used on heating, ventilation, and air conditioning plants

- For 2-port and 3-port control ball valves, internally threaded connections (VAI61.. and VBI61..) or externally threaded connections (VAG61.. and VBG61..), DN15 to DN50.
- For open/close ball valves 2-port and changeover ball valves 3-port, internally threaded connections (VAI60.. and VBI60..) or externally threaded connections (VAG60.. and VBG60..), DN15 to DN50.
- Nominal torque 7 Nm
- Operating voltage AC 24 V ~ / DC 24…48 V ⎓
- GMA321.9E: Operating voltage AC 230 V ~
- Positioning signal DC 0/2...10 V ⎓
- GMA161.9E/MO: RS-485 for Modbus RTU communication
- Prewired with 0.9 m connecting cable

Features

- Brushless, robust DC motors ensure reliable operation regardless of load.
- The valve actuators do not require an end position switch, are overload proof, and remain in place upon reaching the end stop.
- The gears are maintenance free and low noise.
- Suitable for use with modulating (DC 0…10 V), 2-position or 3-position controllers.
- We recommend a minimum pulse length of 500 ms on rotary actuators operated with 3-point control to ensure continuous and accurate operation.
- On plants where the rotary actuator must move to the zero position (emergency position) during power failure.

Functions

Type [1]	**GMA..21.9E**	**GMA131.9E**	**GMA161.9E**	**GMA161.9E/MO**
Control type	2-position	3-position	Modulating	
Rotary direction as per mounting on ball valve	**NC (normally closed) ball valve**	**NC (normally closed) ball valve**	**NC (normally closed) ball valve**	
	Switch on operating voltage: ● Actuator opens Switch off operating voltage: ● Actuator closes with spring return (clockwise)	Signal to Y1 ● – rotation counter-clockwise ● – ball valve opens Signal to Y2 ● – rotation clockwise ● – ball valve closes	0…10 V "counter-clockwise" Flow = 0% at Y = 0 V Flow = 100% at Y = 0 V	
	See mounting instructions M4658 for other switchings.			
Emergency position (Spring return)	On power failure or when the operating voltage is switched off, the spring moves the rotary actuator to its mechanical zero position.			
Position indication: Mechanical	Rotary angle position indication with manual lever as position indicator.			
Position indication: Electrical			Output voltage U = DC 0 to 10 V is generated proportional to rotary angle..	
Manual adjustment	● Without voltage supplied, the rotary actuator can be rotated and fixed in any position using the supplied Allen wrench. ● The rotary actuator returns to the zero position (actuator closed) if mechanically unlocked with an Allen wrench or via short-term voltage			
Modbus RTU (RS-485), not galvanically isolated				Setpoint 0...100 % valve setting Actual value 0...100 % for valve position forced control open / close / Min / Max / Stop Setpoint monitoring and backup mode

[1] When combining GMA..1E and ASK77.2: Carefully read mounting instructions M4696 (74 319 0648 0)!

Technical design

Housing

The housing is made of aluminum:

- Flame retardant

Type summary

Type	Stock No.	Positioning signal	Operating voltage	Position indicator U = DC 0...10 V	Self-adaption rotational angle area	Auxiliary switch	Rotation direction switch
GMA121.9E	BPZ:GMA121.9E	2-position	AC 24 V ~ / DC 24…48 V ⎓	–	–	–	Yes
GMA321.9E	BPZ:GMA321.9E		AC 230 V ~				
GMA131.9E	BPZ:GMA131.9E	3-position	AC 24 V ~ / DC 24…48 V ⎓				
GMA161.9E	BPZ:GMA161.9E	DC 0...10 V ⎓		Yes	Yes		
GMA161.9E/MO	S55499-D683	Modbus RTU					

Accessories / spare parts

Accessories

⚠ DANGER

Hazard to life caused by a lack of ground for the combination ALJ100 with GMA32..E!

Combining rotary actuator GMA32..E operated at AC 230 V ~ with temperature adapter ALJ100 results in life-threatening shocks due to a lack of ground.

- Never combine rotary actuator GMA32..E with temperature adapater ALJ100.
- Never combine rotary actuators with operating voltage of AC 230 V ~ with temperature adapter ALJ100.

Type	Stock number	Description
ALJ100	S55846-Z115	Temperature adapter for ball valves

Equipment combinations

Rotary actuators are suitable for operating following Siemens ball valves:

VA..61..
2-port control ball valves

Control ball valves with:				k_{vs}[m³/h]	DN	GMA..9E..	
Internal threads [1]	Rp	External threads [2]	G..B			Δp_{max}	Δp_s
–	–	VAG61.15..	G 1 B	1...6.3	15	350	1400
VAI61.15..	Rp ½"	–	–	0.25...10	15		
VAI61.20..	Rp ¾"	VAG61.20..	G 1 ¼ B	4...10	20		
VAI61.25..	Rp 1"	VAG61.25..	G 1 ½ B	6.3...16	25		
VAI61.32..	Rp 1¼"	VAG61.32..	G 2 B	10...25	32		1000
VAI61.40..	Rp 1½"	VAG61.40..	G 2 ¼ B	16...40	40		800
VAI61.50..	Rp 2"	VAG61.50..	G 2 ¾ B	25...63	50		600

VB..61..
3-Port control ball valves

Control ball valves with:				k_{vs}[m³/h]	DN	GMA..9E..	
Internal threads [1]	Rp	External threads [2]	G..B			Δp_{max}	Δp_s
VBI61.15..	Rp ½"	VBG61.15..	G 1 B	1.6...6.3	15	350	–
VBI61.20..	Rp ¾"	VBG61.20..	G 1 ¼ B	4...6.3	20		
VBG61.25-10	Rp 1"	VBG61.25-10	G 1 ½ B	10	25		
VBI61.32-16	Rp 1¼"	VBG61.32-16	G 2 B	16	32		
VBI61.40-25	Rp 1½"	VBG61.40-25	G 2 ¼ B	25	40		
–	–	VBG61.50-40	G 2 ¾ B	40	50		
VBI61.50..	Rp 2"	–	–	40...63	50		

[1] Data sheet N4211
[2] Data sheet N4212

VA..60.. / VB..60..
2-port shut-off valves and 3-port changeover ball valves

Control ball valves with:				k_{vs}[m³/h]	DN	GMA..9E..	
Internal threads [3]	Rp	External threads [4]	G..B			Δp_{max}	Δp_s
–	–	VAG60.15-9	G 1 B	9	15	350	1400
VAI60.15-15	Rp ½"	–	–	15	15		
–	–	VAG60.20-17	G 1 ¼ B	17	20		
VAI60.20-22	Rp 1"	–	–	22	20		
VAI60.25-22	Rp 1"	VAG60.25-22	G 1 ½ B	22	25		
VAI60.32-35	Rp 1¼"	VAG60.32-35	G 2 B	35	32		1000
VAI60.40-68	Rp 1½"	VAG60.40-68	G 2 ¼ B	68	40		800
VAI60.50-96	Rp 2"	VAG60.50-96	G 2 ¾ B	96	50		600
VBI60.15-5L	Rp ½"	VBG60.15-5L	G 1 B	5	15	350	–
–	–	VBG60.20-8L	G 1 ¼ B	8	20		
VBI60.20-9L	Rp 1"	–	–	9	20		
VBI60.25-9L	Rp 1"	VBG60.25-9L	G 1 ½ B	9	25		
VBI60.32-13L	Rp 1¼"	VBG60.32-13L	G 2 B	13	32		
VBI60.40-25L	Rp 1½"	VBG60.40-25L	G 2 ¼ B	25	40		
VBI60.50-37L	Rp 2"	VBG60.50-37L	G 2 ¾ B	37	50		
–	–	VBG60.15-8T	G 1 B	8	15	350	–
VBI60.15-12T	Rp ½"	–	–	12	15		
–	–	VBG60.20-13T	G 1 ¼ B	13	20		
VBI60.20-16T	Rp 1"	–	–	16	20		
–	–	VBG60.25-13T	G 1 ½ B	13	25		
VBI60.25-16T	Rp 1"	–	–	16	25		
VBI60.32-25T	Rp 1¼"	VBG60.32-25T	G 2 B	25	32		
VBI60.40-49T	Rp 1½"	VBG60.40-49T	G 2 ¼ B	49	40		
VBI60.50-73T	Rp 2"	VBG60.50-73T	G 2 ¾ B	73	50		

[3] Data sheet N4213
[4] Data sheet N4214

Product documentation

Topic	Title	Document ID
Data sheet	Rotary actuators for ball valves	N4658
Mounting instructions	GMA..9E..	M4658
Mounting instructions	VAI61 / VBI61..	M4211
Mounting instructions	VAG61 / VBG61..	M4212
Mounting instructions	VAI60.. / VBI60..	M4213
Mounting instructions	VAG60.. / VBG60..	M4214

Related documents such as the environmental declarations, CE declarations, etc., can be downloaded from the following Internet address:
https://siemens.com/bt/download

Notes

Additional information on rotary actuators is available in document Z4614.

Safety

⚠ CAUTION

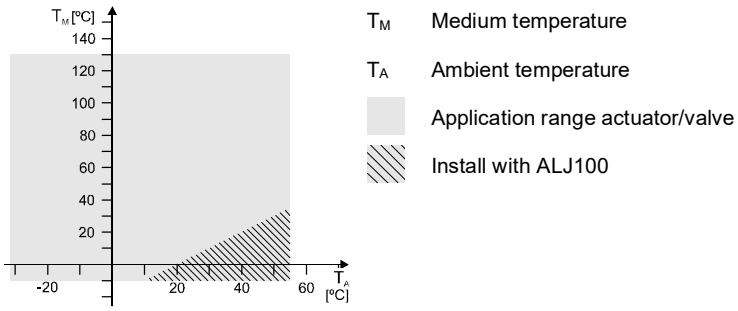
National safety regulations

Failure to comply with national safety regulations may result in personal injury and property damage.

- Observe national provisions and comply with the appropriate safety regulations.
- Mounting, commissioning, and service by properly trained personnel only.

Engineering

We recommend using temperature adapter ALJ100 in locations exposed to condensation to protect the actuator. Lubricate the adapter axle at medium temperatures ≤ 0 °C.



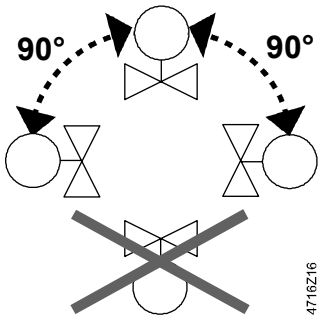
GMA161.9E/MO

The Modbus converter is designed for analog control at 0...10 V.

Mounting

Both ball valve and rotary actuator can be easily and directly assembled at the mounting location. No special tools or adjustments required.

Alignment



Installation

	**⚠ WARNING** **No internal line protection for supply lines to external consumers** Risk of fire and injury due to short-circuits! ● Adapt the wire cross sections as per local regulations to the rated value of the installed fuse.

Commissioning

When commissioning the system, check both wiring and rotary actuator functions.

Maintenance

GMA..9E.. actuators are maintenance-free.

Disposal

	**⚠ WARNING** **Tensioned return spring** Opening the drive housing can release the highly tensioned return spring, which can cause flying parts and injuries. ● Do not open the drive housing.

	The device is considered an electronic device for disposal in accordance with the European Guidelines and may not be disposed of as domestic garbage. ● Dispose of the device through channels provided for this purpose. ● Comply with all local and currently applicable laws and regulations.

Warranty service

Technical data on specific applications are valid only together with Siemens products listed under "Equipment combinations". Siemens rejects any and all warranties in the event that third-party products are used.

Technical data

Power GMA1..9E..			
Operating voltage AC		AC 24 V ± 20 %	
Frequency		50/60 Hz	
Operating voltage DC		DC 24…48 V ± 20 %	
Power consumption	Operation	AC: 5 VA / 3.5 W	
		DC: 3.5 W	
	Hold	GMA121.9E / GMA131.9E	AC / DC: 2 W
		GMA161.9E..	AC / DC: 2,5 W

Power GMA321.9E		
Operating voltage		AC 230 V ± 10 %
Frequency		50/60 Hz
Power consumption	Operation	7 VA / 4.5 W
	Hold	3.5 W

Function data		
Nominal torque		7 Nm
	Maximum torque (when blocked)	21 Nm
	Minimum holding torque	4 Nm
Nominal rotation angle (with position indication)		90°
	Maximum rotation angle (mechanically limited)	95° ± 2°
Runtime at nominal rotational angle 90°		90 [s]
Closing time with spring return (on power failure)		15 s

Inputs GMA1..9E..			
Positioning signal			
	Switching current (at AC 24 V / DC 24…48 V ⎓) for "Open"/"Close"		> AC / DC 8 mA
	Input voltage Y	(wires 8-2)	DC 0…10 V ⎓
	Max. permissible input voltage		DC 35 V
		(Wires 9-2)	DC 0…10 V ⎓
	Max. output current		DC ± 1 mA

Communication GMA161.9E/MO			
Communication protocol			
	Modbus RTU		RS-485, not galvanically isolated
	Number of nodes		Max. 32
	Address range		1…248 / 255
		Factory setting	255
	Transmission formats		1-8-E-1 / 1-8-O-1 / 1-8-N-1 / 1-8-N-2
		Factory setting	1-8-E-1
	Baud rates (kbaud)		Auto / 9.6 / 19.2 / 38.4 / 57.6 / 76.8 / 115.2
		Factory setting	Auto
	Bus termination		120 Ω electronically switchable
		Factory setting	Off

Outputs GMA1..9E..			
Output signal			
	Output voltage U	(Wires 9-2)	DC 0…10 V ⎓
	Max. output current		DC ± 1 mA

Connection cables	
Cable length	0.9 m
Cable cross-section	0.75 mm^2

Ambient conditions and protection classification		
Device IP class per EN 60730		
	AC 24 V ~ / DC 24 V ⎓	III
	AC 230 V ~	II
Degree of protection of housing to EN 60529		IP54
Operation		As per IEC 60721-3-3
	Climatic conditions	Class 2K3
	Temperature (extended)	-32...55 °C
	Humidity (non-condensing)	<95 % r.h.
Transportation		Transport per IEC 60721-3-2
	Climatic conditions	Class 3K5 / Class 2K3
	Temperature (extended)	-32...70 °C
	Humidity (non-condensing)	<95 % r.h.

Ambient conditions and protection classification		
Storage		Per IEC 60721-3-1
	Climatic conditions	Class 1K3
	Temperature (extended)	-32…50 °C
	Humidity (non-condensing)	<95 % r.h.
Mechanical ambient conditions		Class 2M2

Standards, directives and approvals	
Product standards	EN 60730 Part 2-14: Particular requirements for electric actuators
Electromagnetic compatibility (field of use)	For residential, commercial, and industrial environments
EU conformity (CE)	8000081792 [1)]
RCM conformity	8000081793 [1)]

Environmental compatibility
The product environmental declaration CE1E4614en [1)] contains data on environmentally compatible product design and assessments (RoHS compliance, materials composition, packaging, environmental benefit, disposal).

Dimensions
See Dimensions [▶ 13]

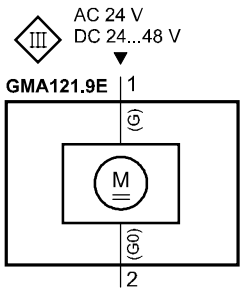
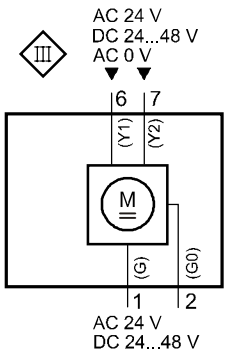
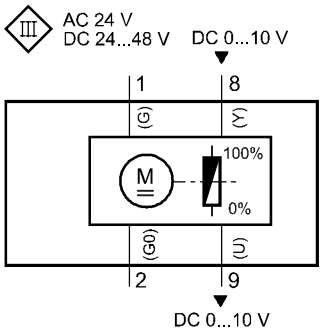
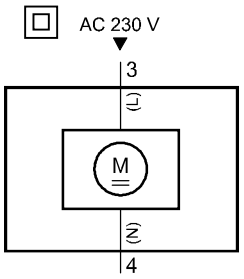
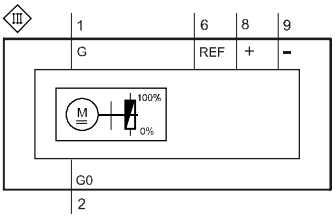
Weight GMA1..9E..		
Excl. packaging		1.2 kg
	External Modbus converter	0.15 kg

Weight GMA321.9E	
Excl. packaging	1.3 kg

[1)] Documents can be downloaded at http://www.siemens.com/bt/download

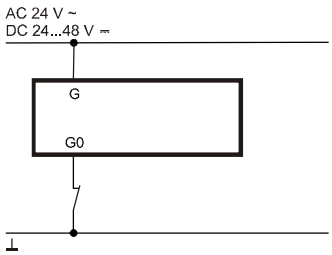
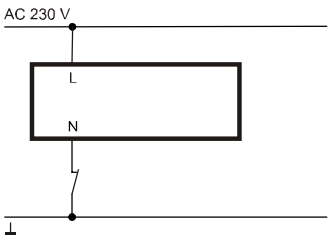
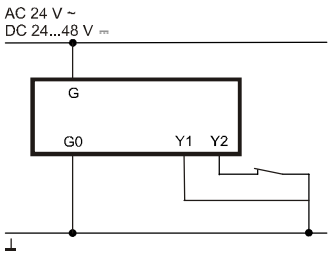
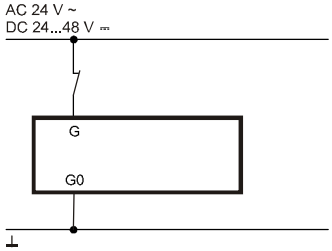
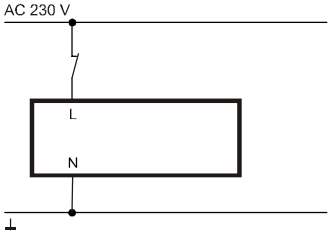
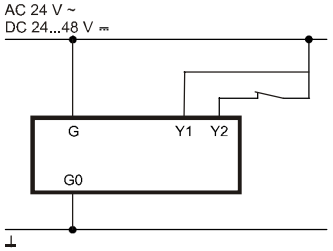
Connection diagrams

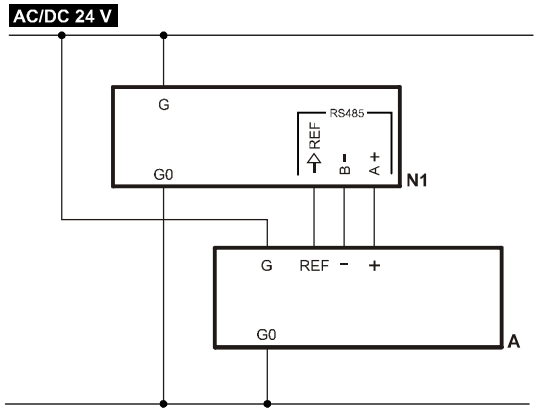
Internal diagrams

GMA..21.9E	GMA131.9E	GMA161.9E..
2-position control	3-position control	Modulating control DC 0…10 V
		
		Modbus
		

Connection diagrams

Single pole single throw (SPST)

GMA121.9E	GMA321.9E	GMA131.9E..
2-position control		3-position control
		
		

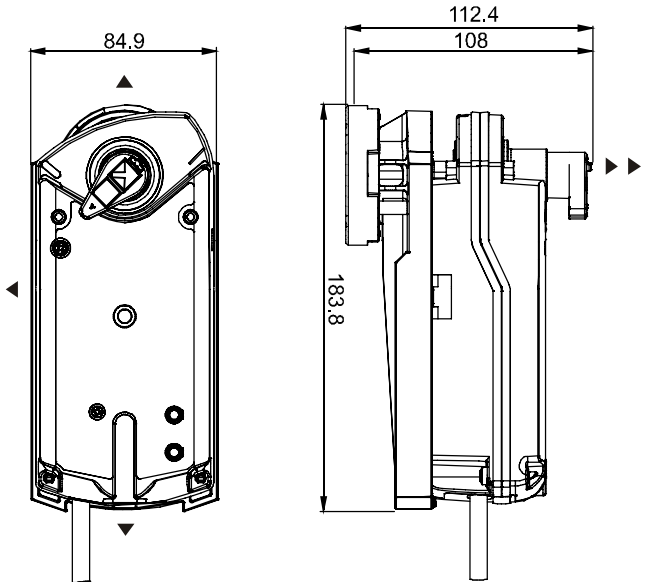
GMA161.9E	GMA161.9E/MO
Modulating control DC 0…10 V	
	

Cable designations

Connecting thread	Cable				Meaning
	Code	No.	Color	Abbr.	
Rotary actuators AC 24 V ~ DC 24 V ⎓	G	1	Red	RD	System potential AC 24 V ~ / DC 24 V...48 V ⎓
	G0	2	Black	BK	System neutral
	Y1	6	Purple	VT	Positioning signal AC 0 V, AC 24 V ~ / DC 24…48 V ⎓ "Counter-clockwise" NC.
	Y2	7	Orange	OG	Positioning signal AC 0 V, AC 24 V ~ / DC 24…48 V ⎓ "Clockwise" NC.
	Y	8	Gray	GY	Positioning signal DC 0...10 V
Rotary actuators AC 230 V ~	U	9	Pink	PK	Position indication 0...10 VDC
	L	3	Brown	BN	Phase AC 230 V
Modbus AC 24 V ~ DC 24 V ⎓	N	4	Blue	BU	Neutral conductor
	REF	6	Purple	VT	Reference line (Modbus RTU)
	+	8	Gray	GY	Bus + (Modbus RTU)
	-	9	Pink	PK	Bus - (Modbus RTU)

Dimensions

Actuator

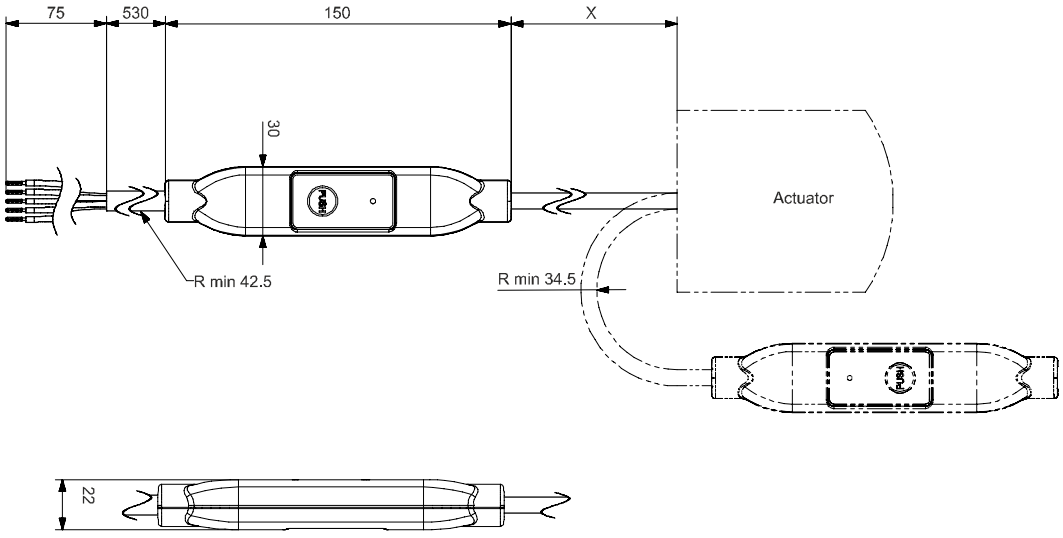


Dimensions in mm

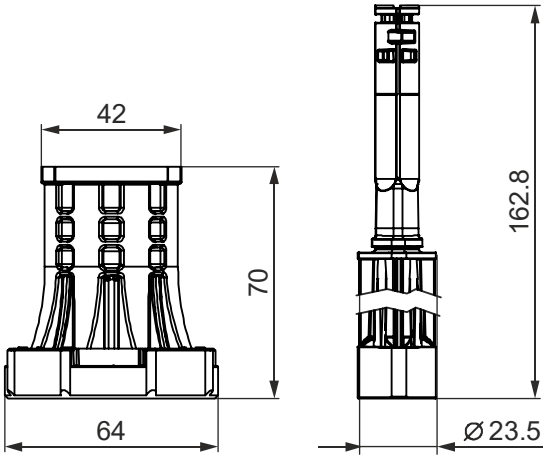
▶ = >100 mm
▶▶ = >200 mm

Min. clearance from ceiling or wall for mounting, connection, operation, maintenance, etc.

External Modbus converter



Temperature adapter (optional)



Revision numbers

Type	Valid from rev. no.
GMA121.9E	..B
GMA321.9E	..B
GMA131.9E	..B
GMA161.9E	..B
GMA161.9E/MO	..C

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