



Smart actuator™



Cable unit ASYL15

Electromotoric actuators

for Combi-valve types VPI45.., DN15...32 5mm stroke
 for Proportional terminal valve type VVI44../46... 5mm stroke
 for Radiator valve VVK4... 3~ 5 mm stroke

AQS36..
AQS86..
AQS66..

- AQS36.. operating voltage AC 230 V 3-position control signal
- AQS86.. operating voltage AC 24 V 3-position control signal
- AQS66.. operating voltage AC/DC 24 V DC 0...10 V, 2...10V,
3-position control signal
- AQS66EP equal-percentage valve characteristic
- Nominal force > 250 N
- Automatic identification of valve stroke
- Direct mounting with union nut, no tools required
- Basic types complete with plug-in connecting cable, length 1.5 m
- Optional cable types
 - cable length 1.5 m, 2.5 m and 4.5 m
 - halogen-free cables
- Manual override and position indication
- Parallel connection of multiple actuators possible

Use

For operation of Siemens valves VPI45.. for water-side control of hot and cooling water in heating, ventilation and air conditioning systems.

For operation of ATI valves VVI44.. or VVI46.. water-side control of hot and cooling water in heating, ventilating and air conditioning systems.

For other brands of valves can also be fitted with a special adaptors for specific brands.

For the high temperature application such as saturated steam flow controls special valve adaptors are required to protect electronics in control module of actuator.

Type summary

Standard versions

Type reference	Operating voltage	Positioning time at 50 Hz	Control signal	Connecting cable
AQS36	AC 230 V	150 s	3-position	1.5 m
AQS36/00 ¹⁾				no cable
AQS86	AC 24 V			1.5 m
AQS86/00 ¹⁾				no cable
AQS66	AC / DC 24 V	75 s	DC 0...10 V DC 2...10 V 3-position	1.5 m
AQS66/00 ¹⁾				no cable
AQS66EP ²⁾				1.5 m
AQS66EP/00 ²⁾				no cable

¹⁾ Available cable lengths or terminal block connectors refer to "Accessories", page 2

²⁾ Equal-percentage valve characteristics

AQS66.. are UL and cUL approved.

Accessories

Type reference	Description	Operating voltage	Control signal
ASY3L15	Connecting cable 1.5 m	AC 230 V	3-position
ASY3L25	Connecting cable 2.5 m		
ASY3L45	Connecting cable 4.5 m		
ASY6L15	Connecting cable 1.5 m	AC / DC 24 V	DC 0...10 V DC 2...10 V
ASY6L25	Connecting cable 2.5 m		
ASY6L45	Connecting cable 4.5 m		
ASY6L45HF	Connecting cable 4.5 m, halogen-free, VDE 0207-24		
ASY8L15	Connecting cable 1.5 m	AC 24 V	3-position
ASY8L25	Connecting cable 2.5 m		
ASY8L25B	Connecting cable 2.5 m with Batigr connector		
ASY8L45	Connecting cable 4.5 m		
ASY8L45HF	Connecting cable 4.5 m, halogen-free, VDE 0207-24		
ASY98	Retaining screw for terminal block connectors		
ASY99	Terminal block connector for 3-position actuator AQS86/00 (AC 24 V)		
ASY100	Terminal block connector for DC 0...10 V modulating actuators AQS66/00		

Ordering

Example:

Type	Stock no.	Description	Quantity
AQS86/00	AQS86/00	Smart valve actuator	1
ASY6L15	ASY6L15	Cable 1.5m	1

Delivery

Actuators, valves and accessories are packed separately. Items are supplied individually packed.

Rev.-No.

Overview tables, see page 8.

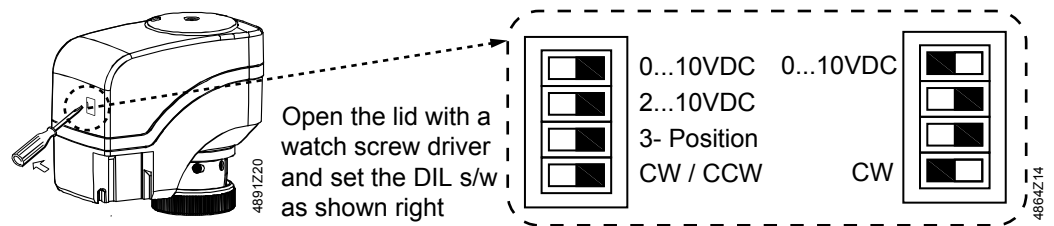
Equipment combinations

Type reference	DN	Actuators	Valve type	Stroke [mm]	V ₁₀₀ [l/h]	PN class	Data sheet
VPI45..	DN15...DIN32	AQS..	Combi valves	5	75 ... 3000	PN25	N4853
VPI45..Q			Combi valves with P/T plugs				
VVI44..	DN15, DN25	AQS..	Combi valves	5	75... 3500	PN16	N4854
VVI46..Q			Combi valves with P/T plugs				
MGV46..Q	DIN15	AQS..	Manifold valves with 5mm	5	75 ... 2500	PN16	N4873
VPI45..	DN40, DN50	SQD..	Combi valves	6.5	2300...8500	PN25	N4540
VPI45..Q			Combi valves with P/T plugs				
VVP45..Q	DN15...32		Zone valves with P/T plugs	5	2300...8500	PN25	N4540
VVK41/42..	DN15... DN32		Zone valves /Radiator valves	3.0	75 ... 2500	PN16	N2113

V₁₀₀ = volumetric flow, in l/h, through the fully open valve (H₁₀₀)

This Smart Actuator is a newly developed for universal input signals from standard 3-pos. 0...10Vdc and 2...10Vdc control voltage at 24Vac power source. Control signal can be selected by programming DIL switches on the front of the actuators.

Programming example for setting input signal of 0...10Vdc



When the actuator is driven by DC 0...10 V control voltage or by a 3-position signal, it produces a stroke which is transmitted to the valve stem. The description of operation in this document applies to the valve versions which are fully closed when de-energized (NC valves).

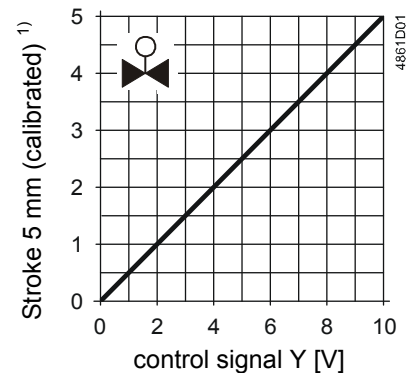
3-position control signal
AQS36../AQS86..

- Voltage at Y1: Stem extends Valve opens
- Voltage at Y2: Stem retracts Valve closes
- No voltage at Y1 and Y2: Actuator maintains its current position

DC 0...10 V control signal
AQS66, AQS66/00

- The valve opens / closes in proportion to the control signal at Y.
- At DC 0 V, the valve is fully closed (A → AB).
- When power supply is removed, the actuator maintains its current position.

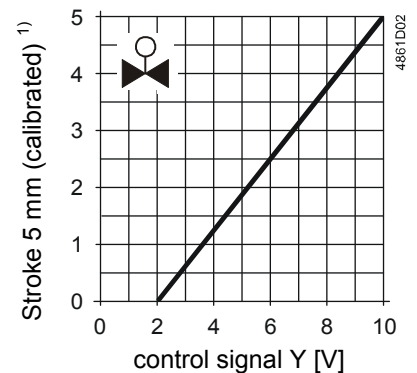
¹⁾ Actuator is calibrated to 5 mm stroke of VPI45../VVI4X



DC 2...10 V control signal
AQS66.2, AQS66.2/00

- The valve opens / closes in proportion to the control signal at Y.
- At DC 2 V, the valve is fully closed (A → AB).
- When power supply is removed, the actuator maintains its current position.

¹⁾ Actuator is calibrated to 5 mm stroke of VPI45../VVI4X

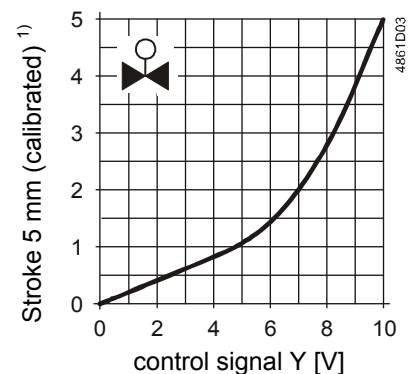


DC 0...10 V control signal
AQS66EP,
AQS66EP/00

Combi valves VPI45..., DN15...32 in combination with AQS66EP.. have an equal-percentage characteristics.

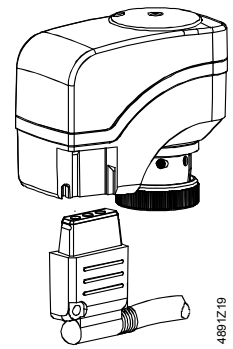
- The valve opens / closes in proportion to the control signal at Y.
- At DC 0 V, the valve is fully closed (A → AB).
- When power supply is removed, the actuator maintains its current position.

¹⁾ Actuator is calibrated to 5 mm stroke of VPI45../VVI4X



Features and benefits

- Plastic housing
- Locking-proof, maintenance-free gear train
- Manual override with hexagonal socket wrench 3 mm
- Reduced power consumption in the holding positions
- Load-dependent switch-off in the event of overload and in stroke end positions
- Parallel operation of 6 AQS36..., 24 AQS86.. and 10 AQS66.. possible, provided the controllers' output is sufficient
- Terminal block connectors for custom made cables available (only for use with AC 24 V and AC/DC 24 V actuators)
- Connecting cables with AC 24 V and AC 230 V connectors cannot be mixed up
- Halogen-free cables available

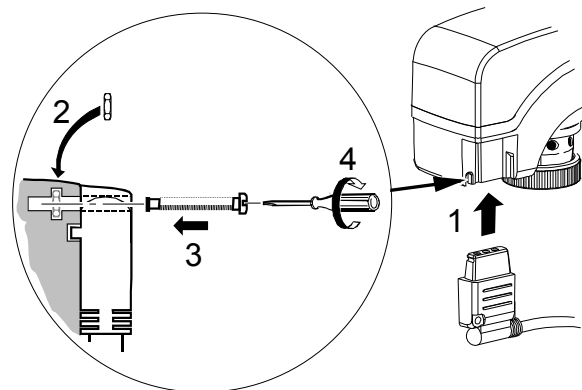


Accessories

Retaining screw ASY98

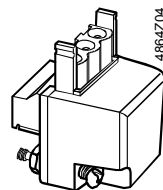


Type ASY98 to secure the cable connector



The cable connector snaps into position, but can be additionally secured with the retaining screw.

Terminal block connectors ASY99 ASY100



For special cable lengths of the AC 24 V and AC/DC 24 V actuators.

- Type ASY99 for 3-position actuators AQS86/00
- Type ASY100 for DC 0/2...10 V modulating actuators AQS66../00

The terminal block connectors are supplied complete with Mounting Instructions (74 369 0385 0).

Notes

Engineering

The actuators must be electrically connected in accordance with local regulations (refer to "Connection diagrams"), page . 8

⚠ Caution

Regulations and requirements to ensure the safety of people and property must be observed at all times!

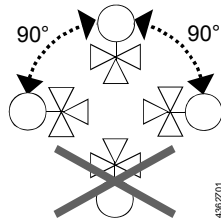
The permissible temperatures (refer to "Technical data", page 6) must be observed. The connecting cable of the actuator may come into contact with the hot valve body, provided the temperature of the valve body does not exceed 80 °C.

Mounting

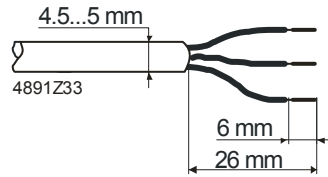
The Mounting Instructions 4 369 0644 0 are enclosed in the product packaging. Assembly is made with the union nut; no tools or adjustments are required. The actuator must be fitted in position 0 (also refer to "Manual override", page 5) without operating voltage.

In the case of actuators without connecting cable (AQS../00), the separately ordered terminal block connector and connecting cable must be fitted.

Orientation



Installation



Crimp ferrule on stripped wire of connecting cable.

Commissioning

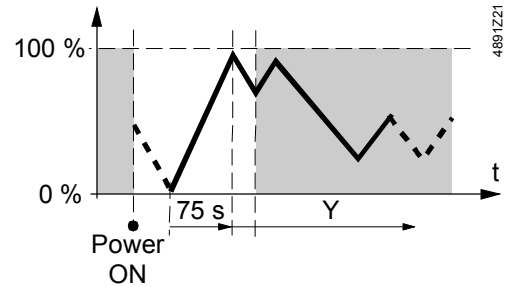
When commissioning, check wiring and the functioning of the actuator.

- Actuator stem extends (from position 0 to 1): Valve opens
- Actuator stem retracts (from position 1 to 0): Valve closes

Self-calibration

⚠ Caution

During commissioning and whenever the operating voltage is switched on, the AQS66.. runs a self-calibration routine. (Valve stroke 0 → Max. stroke → Setpoint). Never intervene manually in this process.



Note: Correct calibration is only possible

- with valve
- stroke > 1.5 mm

The second or third attempt at calibration occurs automatically after an 8-minute delay.

After three failed calibration attempts the actuator stem remains in the extended position and the VPI45.. valves are opened.

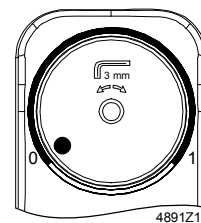
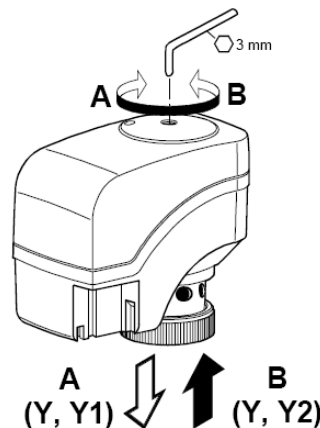
For valves with strokes < 1.5 mm, the actuator/valve combination locks after three failed calibration attempts.

Manual override

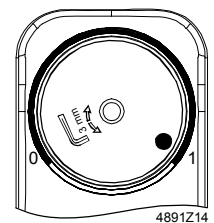
A 3 mm hexagonal socket wrench can be used to move the actuator to any position between 0 and 1. If a control signal from the controller is present, then this takes priority in determining the position.

Note

To retain the manually set position, unplug the connecting cable or switch off power and the control signal.



Position indicator in position 0: Valve closed



Position indicator in position 1: Valve open

Maintenance

The actuators are maintenance-free.

When carrying out service work on the plant, following must be noted:

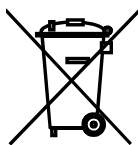


- Turn power off (e.g. remove the plug)
- If necessary, disconnect electrical connections from the terminals
- The actuator must be commissioned only with a correctly mounted valve in place!

Repair

AQS.. actuators cannot be repaired; the complete unit must be replaced.
Broken connecting cables can be replaced, see "Accessories", page 2.

Disposal



The device must not be disposed of together with domestic waste. This applies in particular to the PCB.
Legislation may demand special handling of certain components, or it may be sensible from an ecological point of view.
Current local legislation must be observed.

Warranty

The technical data given for these applications is valid only when the actuators are used with the Siemens valves listed under "Equipment combinations", page 2.

The use of the AQS.. actuators in conjunction with third-party valves invalidates any warranty offered by Siemens Switzerland Ltd / HVAC Products.

Technical data

		AQS36..	AQS86..	AQS66..	
Power supply	Operating voltage	AC 230 V	AC 24 V	AC 24 V or	DC 24 V
	Voltage tolerance	± 15 %	± 20 %	± 20 %	± 25 %
	Rated frequency	50 / 60 Hz			
	Max. power consumption	6 VA	0.8 VA	2.5 VA	
Control	Fuse for incoming cable	2 A, quickblow			
	Control signal ¹⁾	3-position		AQS66..	DC 0...10 V
				AQS66.2..	DC 2...10 V
	Input impedance for DC 0/2...10 V			> 100 kΩ	
	Positioning accuracy for DC 0/2...10 V			< 2 % of nominal stroke	
Functional data	Parallel operation (number of actuators) ²⁾	max. 6	max. 24	max. 10	
	Run time for 5.5 mm stroke at 50 Hz	150 s		75 s	
	Nominal stroke	6.0 mm			
	Nominal force	> 250 N			
	Perm. temperature of medium in the connected valve	1...110°C			
	Electrical connections	Connecting cable of basic types	1.5 m 3-core to EN 60320 / IEC 60227		
ASY 99, ASY100		cable diameter	< 5 mm		
		wire cross section	0.5...0.75 mm ²		
ASY3L..		wire cross section	0,75 mm ²		
	ASY6L..., ASY8L..	wire cross section	0,5 mm ²		
Standards	Meets requirements for CE marking:				
	EMC directive	2004/108/EC			
		Immunity	EN 61000-6-2	Industrial ³⁾	
		Emission	EN 61000-6-3	Residential	
	Low voltage directive	2006/95/EC			
		Electrical safety	EN 60730-1		
	Protection class to EN 60730	II		III	
	Contamination level	EN 60730, Class 2			
	Housing protection				
	Upright to horizontal	IP40 to EN 60529			
	UL approbation			UL 873	
	cUL approbation			C22.2 No. 24-93	

¹⁾ AQS66EP.. in combination with combi valves VPI45..., DN15...32: Equal-percentage valve characteristics

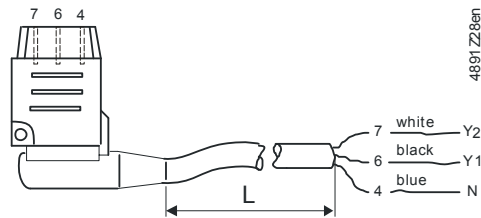
²⁾ Provided the controllers' output is sufficient

³⁾ Transformer 160 VA (e.g. Siemens 4AM3842-4TN00-0EA0) for AC 24 V actuators

		AQS36..	AQS86..	AQS66..
Dimensions / weight	Environmental compatibility	ISO 14001 (Environment) ISO 9001 (Quality) SN 36350 (Environmentally compatible products) RL 2002/95/EG (RoHS)		
	Dimensions	refer to "Dimensions", page 9		
	Coupling thread to valve	union nut M30x1.5 mm		
	Weight	0.35 kg		
Housing colors	Base and cover	RAL 7035 light gray		
General ambient conditions		Operation EN 60721-3-3	Transport EN 60721-3-2	Storage EN 60721-3-1
	Environmental conditions	Class 3K3	Class 2K3	Class 1K3
	Temperature	+1...+50 °C	-25...+70 °C	-5...+50 °C
	Humidity	5...85 % r.h.	< 95 % r.h.	5...95 % r.h.

Connecting cable

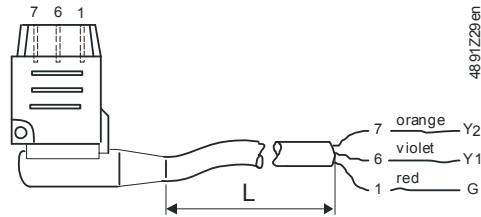
ASY3L.. with AQS36..



7	White	Y2	Control signal OPEN (AC 230 V)
6	Black	Y1	Control signal CLOSE (AC 230 V)
4	Blue	N	Neutral

L = 1,5 m, 2,5 m, or 4,5 m

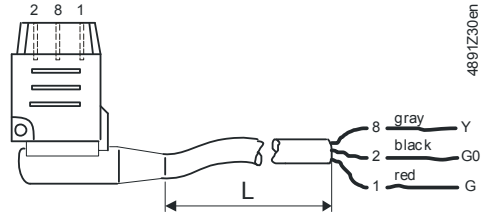
ASY8L.. with AQS86..



7	Orange	Y2	Control signal OPEN (AC 240 V)
6	Violet	Y1	Control signal CLOSE (AC 240 V)
1	Red	N	System potential AC 24 V

L = 1,5 m, 2,5 m, or 4,5 m

ASY6L.. with AQS66..

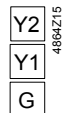
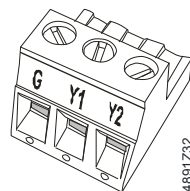


8	Grey	Y	Control signal DC 0/2...10 V
2	Black	G0	System neutral (- DC 24 V)
1	Red	G	System potential AC 24 V (+ DC 24 V)

L = 1,5 m, 2,5 m, or 4,5 m

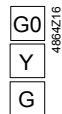
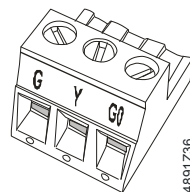
Connection terminals

ASY99
for AQS86..



Control signal CLOSE
Control signal OPEN
System potential AC 24 V

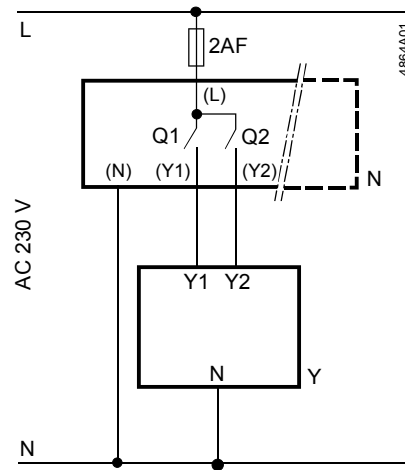
ASY100
for AQS66..



System neutral
Control signal DC 0/2...10 V
System potential AC/DC 24 V

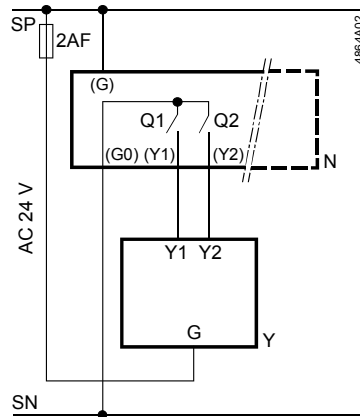
Connection diagrams

AQS36..



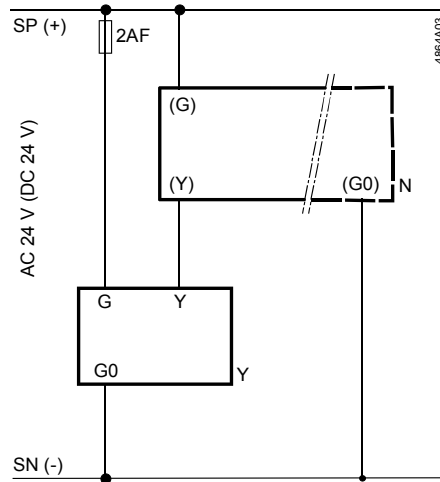
- N Controller
- Y Actuator
- L System potential AC 230 V
- N System neutral
- Y1, Y2 Control signal OPEN, CLOSE
- Q1, Q2 Controller contacts

AQS86..



- N Controller
- Y Actuator
- SP, G System potential AC 24 V
- SN, G0 System neutral
- Y1, Y2 Control signal OPEN, CLOSE
- Q1, Q2 Controller contacts

AQS66..

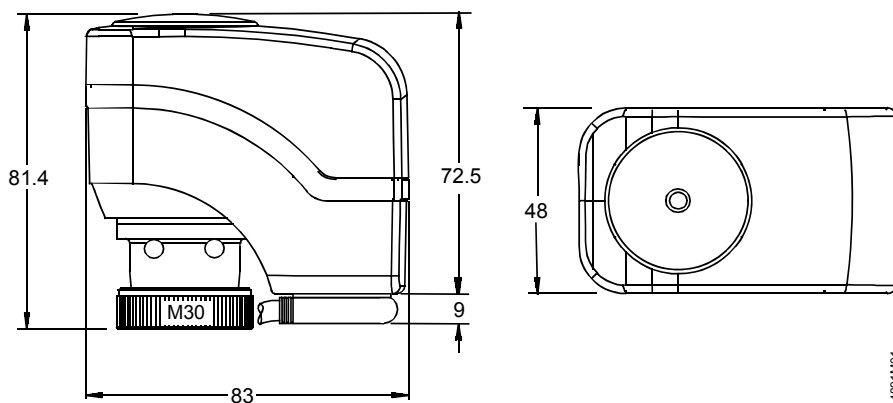


- N Controller
- Y Actuator
- SP, G System potential AC/DC 24 V
- SN, G0 System neutral
- Y Control signal

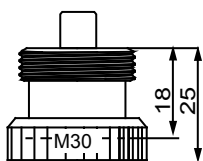
Dimensions

Actuator
AQS36..
AQS86..
AQS66..

All dimensions in mm



Special adaptors for high temperature application are also available upon optional order.



ASK44.20A/5mm stroke
for valve type VVI44..
made of POM

Adaptors for other brands' valves are in preparation.

Revision numbers

Type reference	Valid from Rev.-No.	Type reference	Valid from Rev.-No.
AQS36.250C	July, 2015	AQS66.250C	July, 2015
AQS36/00	..J	AQS66EP	..J
AQS86.250C	July, 2015	AQS66EP/00	..J
AQS86/00	..J	AQS66.2	..J
AQS66	..J	AQS66.2/00	..J

Notes; We reserve the right to make changes and improvements in our products which may affect the accuracy of the information contained in this leaflet.

All data in this leaflet are of our own test and design target so the information here in may