

Ducted Split System Air Conditioner

Technical Data ISD 310KB/OSA 310RKTBV



R410A

**High Efficiency
EC Motor**

**Plug Fan version
for High External Static**

**Twin System
Enables Staging**

**Extra Long Life
Epoxy Coated Outdoor Coil**

**Nominal Cooling Capacity
31.6 kW**

**diGital
OPTION**

ISD 310KB / OSA 310RKTB DUCTED SPLIT SYSTEM AIR CONDITIONER

GENERAL

The ISD indoor unit, together with its associated OSA outdoor unit, provides a reverse cycle (heat pump) split system air conditioner designed and developed to comply with and exceed AS/NZS 3823 specified conditions. The system has been successfully tested at 50°C ambient.

The ISD indoor unit is available in two versions:

ISD 310KBY – EC motor for high efficiency
ISD 310KB-P – EC motor for high efficiency & Plug fan design for high external static.

APPLICATIONS

These units have been specifically developed for air conditioning of commercial premises, e.g. offices, motels, shops and restaurants.

Air Flow Selection

If the air returning to the indoor coil is regularly expected to be above 50%RH, then the coil face velocity should be limited to be 2.5 m/s or less (refer graph below).

High humidity levels can occur in tropical or subtropical conditions, and/or when heavily moisture laden fresh air is introduced. Consideration must always be given to selecting an air flow and face velocity that avoids water carry-over problems.

Applications using full or high proportions of fresh air should be referred to your nearest **temperzone** sales office to establish the correct selection of units.

FEATURES

Refrigerant R410A. Each complete system uses refrigerant R410A which is deemed to have zero ozone depletion potential.

Economical. Each ISD/OSA system has two independent refrigeration circuits to provide the flexibility and economy of two stage operation, i.e. utilising one or two circuits as conditions vary, plus the advantage of staggered starting.

Efficient. Each outdoor unit incorporates a high efficiency scroll compressor. Indoor units include a high efficiency EC motor (95–98% compared to 50–70% for belt drive centrifugal fans). Heat exchange coils incorporate inner grooved (rifled) tube for better heat transfer.

Performance.

ISD 310KBY: Use of forward curved fan enables fine tuning of the indoor unit to match the supply air requirements.

ISD 310KB-P: Use of backward curved plug fan enables fine tuning of the indoor unit to match higher static pressure supply air requirements.

These EC motor fans have a fully integrated speed control that enables soft starting. Fan speed can be stepped to your own requirements or continuously variable using a 0–10V DC control signal. The system includes a temperature sensing head pressure control which enables the system to compensate for outdoor ambient temperatures below 20°C on cooling cycle, and above 15°C on heating cycle.

Quiet. Each integral high efficiency electronically commutated (EC) motor can vary from zero to full speed. This allows slow ramp up with no sudden noise change. The motor can be controlled to have the best air flow for the ducting and requirements as well as used for de-humidifying the space.

Outdoor noise is a function of how hard the unit needs to work. When the outdoor unit is not running at maximum capacity in mid-season the outdoor fan speed and noise reduces.

The compressor is isolated in a built-in, insulated compartment to minimise noise. The indoor unit is also insulated for noise attenuation.

Durable. The indoor and outdoor coil fins are epoxy coated for extra protection in corrosive environments, e.g. salt laden sea air. The outdoor unit's cabinet is constructed from high grade galvanised steel - polyester powder coated (grey) for all weather protection (IP 45). External fasteners are stainless steel. Heat exchange coils comprise aluminium plate fins on mechanically expanded rifled copper tube. Coil protection guards are supplied. The indoor unit's cabinet is constructed from high grade galvanised steel and also includes a polyester powder coated drain tray.

Low Maintenance. Commissioning and maintenance costs are reduced through use of a fan that requires no pulley and belt adjustments or changes like traditional fans.

Soft Starting. EC motors are soft starting therefore have none of the problems associated with high inrush current.

Insulation. Closed cell foam insulation has been used in the indoor unit's cabinet to ensure no particles are introduced into the air stream. The insulation is foil faced and meets fire test standards AS 1530.3 (1989) and BS 476 parts 6 & 7.

Control Option. Fixed and stable air flows can be achieved through use of a differential pressure transducer and controller (supplied by others) to compensate for varying duct static pressures caused by dirty filters or modulating dampers. Commissioning is also made easier. The system is set up for the EC motor to be controlled variably by a 0–10 volt DC signal that can be supplied either by a BMS system, a sophisticated controller or temperzone's optional TZT-100 Controller; the optional Signal Isolator will be required in this instance for ISD 380KBY model.

The systems' UC6 controller is BMS compatible with multi-unit control possible – either via digital and analogue signals or via Modbus. Refer to temperzone for other protocols available.

Self Diagnostics. Each system includes a controller (UC6) with 7 segment LED display to indicate faults and running conditions. Many operating status conditions (including history) can be determined, without gauges, simply by using the optional *UC6 Service Interface* graphical display.

OPTIONAL EQUIPMENT

Outdoor Unit
UC6 Service Interface tool.

Indoor Unit:

1. Vertical supply air configuration.
2. Filters box - integrated return air spigot c/w EU2/G2 filter.
3. Spring Mounting Kit.
4. **temperzone** TZT-100 Room T/stat, or SAT (24V) Controller kit (for non-digitals).
5. Signal isolator (Item no. 201-000-129) for using EC motors in a 0–10V DC continuously variable speed mode on ISD 310KBY model.

SAFETY FEATURES

1. HP and loss of refrigerant protection.
2. Anti-rapid cycle timer and internal overload for compressor protection.
3. Circuit breaker control circuits.
4. Time-and-temperature controlled electronic de-ice switch prevents icing up of the outdoor coil during heating cycle.
5. Frost protection on cooling cycle.
6. Sensor fault indication.
7. Compressor minimum run time to ensure oil return.

COMPRESSOR

Each high efficiency scroll type compressor is hermetically sealed, quiet running and supported on rubber mounts to minimise vibration.

REFRIGERATION PIPING

The standard unit allows for a line length up to 60 m; no extensions.

Max. height separations between units are :
Outdoor unit above indoor unit : 20 m
Outdoor unit below indoor unit : 20 m.

Each OSA is shipped from the factory with a holding charge of HFC-410A (R410A) refrigerant (1kg/sys.). Additional refrigerant will need to be added on site. Liquid and suction service valves are provided. Accurator expansion devices control the flow of refrigerant. The matched indoor unit is shipped with a holding charge of nitrogen. Both units have brazed pipe connections.

WIRING

The electrical supply required (including voltage fluctuation limits) is: 3 phase 342–436 V a.c. 50 Hz with neutral and earth.

The compressor crankcase heater requires a 24 hour power supply. A control panel, with 24V control circuit, is located in the outdoor unit and is fully wired ready to accept the main power supply.

PLUG FAN ADVANTAGES

The ISD 310KB-P model with EC motor and backward curved plug fan design has the following advantages:

- higher static pressure performance (refer page 4)
- quieter than conventional fan (refer page 2); a large aperture supply air spigot reduces exit velocities and therefore less noise down ductwork
- lower installation cost due to a large supply air spigot which lessens the need for duct transitions.

Digital Version:

Digital Scroll Compressor. A digital version of the outdoor unit is available that includes one fixed and one digital compressor. This provides an enhanced variable capacity ability that enables closer control of room temperature. Digital compressors have proven very reliable because of their design simplicity. Electrical harmonic noise is very low.

Extended Capability. Digitals are particularly suitable for applications requiring full or high proportions of fresh air, VAV, close control and supply air temperature control.

The manufacturer operates a quality management system that conforms to AS/NZS ISO 9001:2008.

PERFORMANCE DATA

COOLING CAPACITY (kW)

Total = Total Capacity (kW) Sens. = Sensible Capacity (kW)
 E.A.T. = Entering Air Temperature ○ = Nominal Capacity (kW)

Note: Capacities are **gross** and do not include allowance for fan motor heat loss. Capacities are for close coupled systems. Interconnecting pipework will reduce capacity.

MODELS Indoor / Outdoor Unit / Unit	INDOOR FAN AIR FLOW l/s	INDOOR COIL E.A.T.		OUTDOOR COIL ENTERING AIR TEMPERATURE °C D.B.											
		W.B. °C	D.B. °C	23		27		31		35		39		43	
				Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.	Total	Sens.
ISD 310KB-P / OSA 310RKTBV	1900	15	21	30.9	24.5	30.6	24.4	29.7	24.0	28.3	23.2	26.4	21.9	24.1	20.2
		17	23	32.6	23.9	32.2	23.9	31.3	23.5	29.9	22.8	28.1	21.6	25.7	20.1
		19	27	34.3	27.4	33.8	27.4	33.0	27.0	31.6	26.2	29.7	25.0	27.4	23.3
		21	31	35.9	32.4	35.5	32.5	34.6	32.1	32.2	31.2	31.4	29.8	29.0	27.9

Indoor Air Flow Correction Factors @ nominal conditions

	Indoor Air Flow (%)			
	-20%	-10%	Rated	+10%
Total Capacity	0.95	0.975	1.0	1.025
Sensible Capacity	0.89	0.950	1.0	1.050

NOTE: An optional Outdoor Unit fan speed controller is available and is recommended where cooling is required in below 20°C ambient conditions for long periods of time.

PIPE LENGTH CAPACITY LOSS

ON COOLING CYCLE DUE TO PRESSURE DROP

Note: Loss percentage is approximate only.
 No allowance made for vertical piping.

Pipe Size (mm)		Equivalent Line Pipe Length (m)					Additional Pipe Length to allow per Bend	
Liquid	Suction	5	10	15	20	30	Suction Pipe Size OD	
13	22	0.7 %	2.1 %	3.4 %	4.7 %	6.1 %	22 mm	
							Long 90° Radius (2 x pipe dia.)	
							0.5 m	

HEATING CAPACITY (kW)

G = Gross Heating Capacity kW, based on nominal air flow.
 N = Net Heating Capacity kW allowing for average defrost.

○ = Nominal Capacity (kW)

Reverse Cycle Systems

MODELS Indoor / Outdoor Unit / Unit	INDOOR ENTERING AIR TEMP. °C D.B.	OUTDOOR COIL ENTERING AIR TEMPERATURE (E.A.T.) °C D.B.															
		- 5		- 3		- 1		1		3		5		7		9	
		G	N	G	N	G	N	G	N	G	N	G	N	G	N	G	N
ISD 310KB / OSA 310RB	15	20.5	18.5	22.2	20.0	23.8	21.2	25.3	21.8	26.8	22.9	28.8	27.4	30.7	30.7	31.2	32.2
	20	20.1	18.1	21.8	19.6	23.3	20.7	24.8	21.3	26.3	22.5	28.3	26.8	30.1	30.1	31.6	31.6
	25	19.4	17.5	21.0	18.9	22.4	20.0	23.9	20.5	25.3	21.7	27.2	25.6	29.0	29.0	30.4	30.4

SOUND LEVELS

Sound Power Levels (SWL)

Test Conditions: BS 848 PT2 1985. Installation Type A (free inlet and outlet). Direct method of measurement (reverberant room).
 Measured in decibels re 1 picowatt, at nominal airflow.

Indoor Unit - Supply Air Outlet

MODEL	FAN SPEED	SWL dB(A)	OCTAVE BAND FREQUENCY Hz					
			125	250	500	1 k	2 k	4 k
			SOUND POWER LEVELS (SWL) dB					
ISD 310KBY	900 RPM	71	71	66	68	66	65	61
	1050 RPM	78	76	71	74	73	72	68
	1200 RPM	83	80	76	78	78	77	72
ISD 310KB-P	LOW (7V)	71	72	70	68	67	60	54
	MED (8V)	74	74	73	71	71	65	59
	HIGH (9V)	78	75	79	74	74	69	63

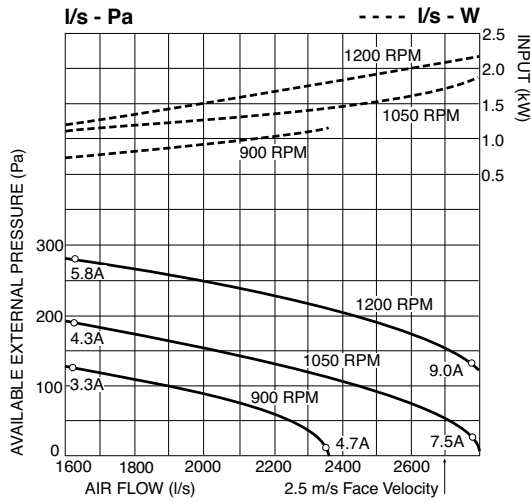
Outdoor Unit

Sound Pressure Level (SPL) in decibels re 20 µPa.

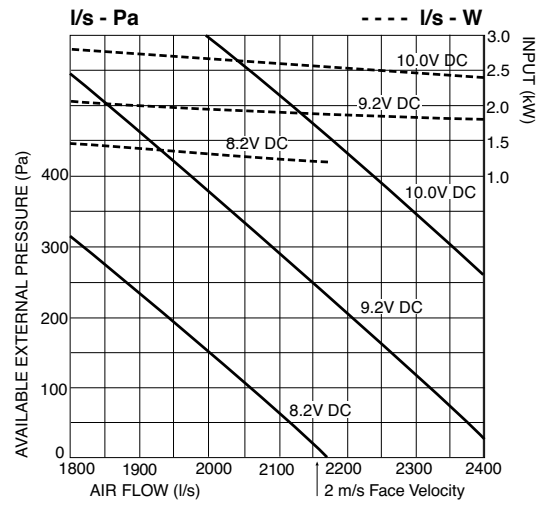
MODEL	FAN SPEED	SWL dB(A)	OCTAVE BAND FREQ. Hz						SPL @ 3 m dB(A)	OCTAVE BAND FREQ. Hz					
			125	250	500	1 k	2 k	4 k		125	250	500	1 k	2 k	4 k
			SOUND POWER LEVELS dB							SOUND PRESSURE LEVELS dB					
OSA 310	LOW	72	78	72	69	67	59	53	56	62	56	53	51	43	37
	HIGH	75	84	74	72	70	63	56	59	62	58	56	54	47	40

AIR HANDLING

ISD 310KBY

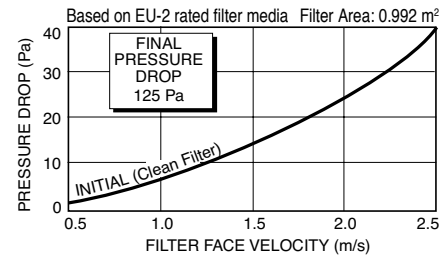


ISD 310KB-P (c/w Plug fans)



Note:
 Airflows are for a dry coil. Reduce airflow by 5% in high moisture removal conditions. In a free blow or low resistance application, beware of exceeding indoor fan motor's full load amp limit.
 As filters are optional, the fan air flows given are for units installed without filters.
 If using EU-2 filter media, provide 0.08 m² face area per 100 l/s of airflow to maximise efficiency.

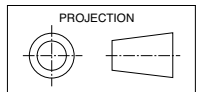
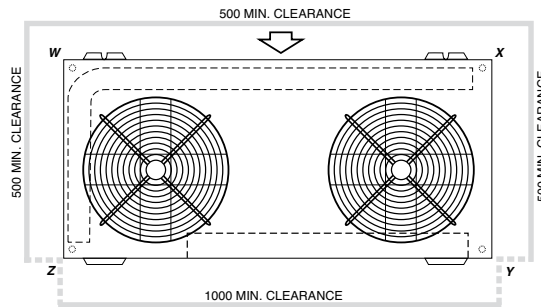
OPTIONAL FILTERS - PRESSURE DROP



DIMENSIONS (mm)

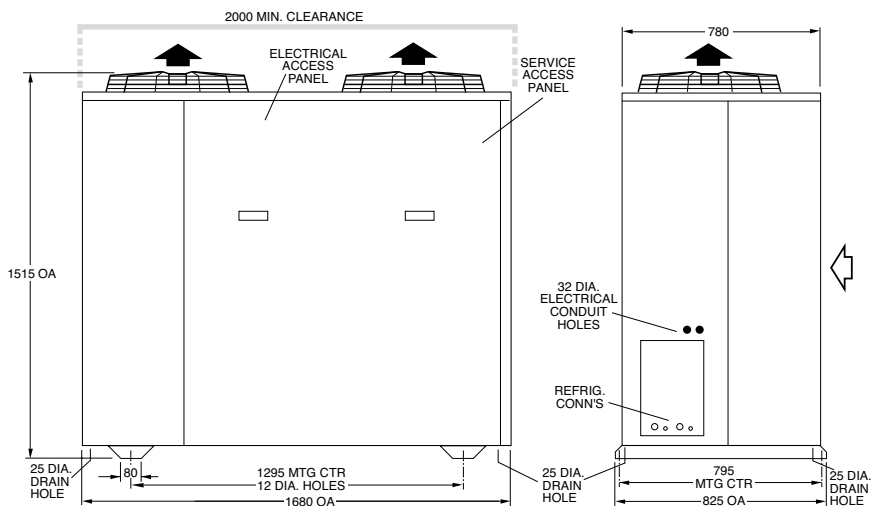
OSA 310RKT(BV) Outdoor Unit

Corner Loads (kg)			
W	X	Y	Z
70	87	75	128



Not to Scale

Note
 Materials and specifications are subject to change without notice due to the manufacturer's ongoing research and development programme.



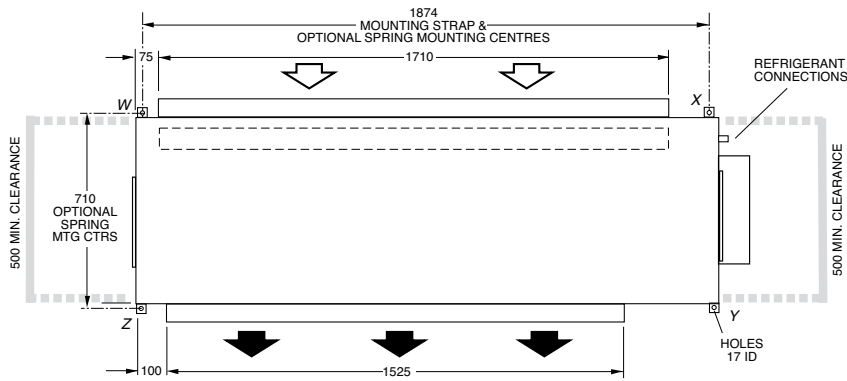
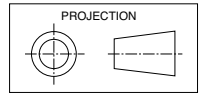
Recommended Pipe Sizes

Suction: 22 mm OD (x2)
 Liquid: 13 mm OD (x2)

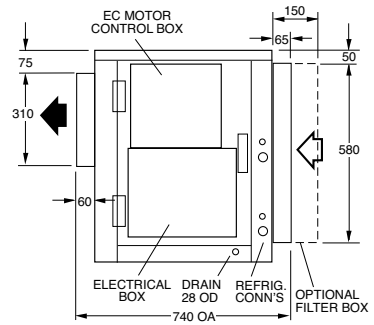
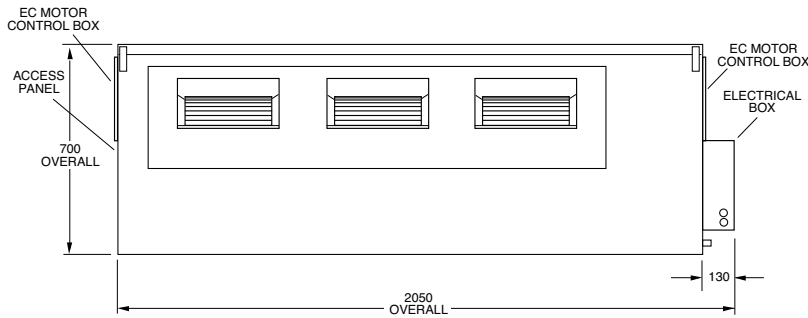
DIMENSIONS (mm)

Not to Scale

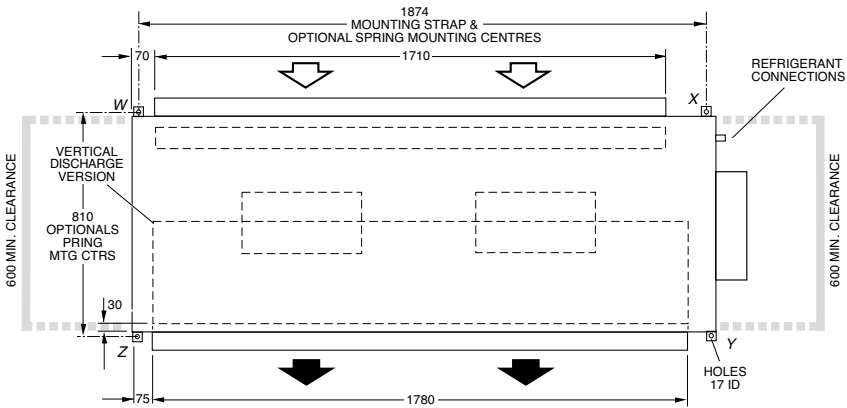
ISD 310KBY Indoor Unit



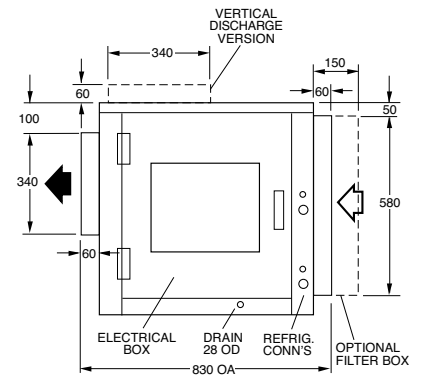
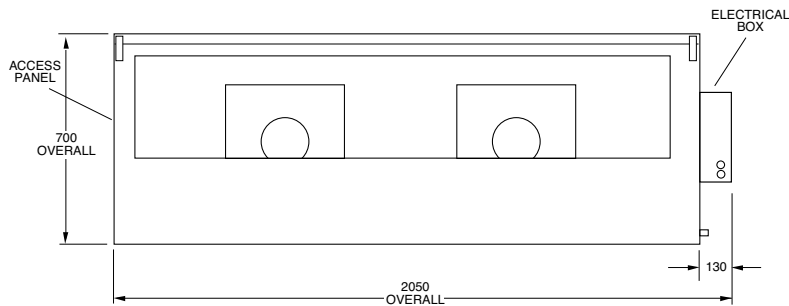
Corner Loads (kg)			
W	X	Y	Z
10	76	18	75



ISD 310KBH-P Indoor Unit c/w Plug Fans



Corner Loads (kg)			
W	X	Y	Z
42	47	35	38



SPECIFICATIONS

Model	OSA 310RKTB c/w:	ISD 310KBY	ISD 310KB-P
Nominal Cooling Capacity *1	kW	31.6	31.6
Net Cooling Capacity	kW	30.7 (31.2)	30.6 (31.2)
Heating Capacity *2	kW	30.1	30.1
EER / AEER (Cooling)		3.37 / 3.35	3.32 / 3.31
COP / ACOP (Heating)		3.85 / 3.83	3.81 / 3.79
Indoor air fan type		forward curved	backward curved
Indoor air fan motor		EC	EC plug
Air Flow *3	l/s	1900	
Power Source *4		3 phase 415 V a.c. 50 Hz	
Indoor Fan Full Load Amps	A/ph.	5.3 & 8.5	2.5 (x2)
Running Amps (Total System)	A/ph.	14 / 16 / 17	23 / 14 / 14
Max. Running Amps (Total Sys.)	A/ph.	19 / 21 / 28	24 / 21 / 21
Refrigerant		HFC-410A (R410A)	
Maximum Vertical Separation	m	20	
Maximum Standard Line Length	m	60	
Pipe Sizes (Suction/Liquid)	mm OD	22 / 13	
Finish	Indoor Unit	zinc galvanised steel	
	Outdoor Unit	grey polyester powder coat	
Net Weight (indoor/outdoor)	kg	179 / 360	162 / 360
Shipping Weight (ind/out) (approx.)	kg	199 / 430	185 / 430

Notes:

*1 Nominal Cooling Capacity at AS/NZS 3823 conditions:

Indoor Entering Air Temperature 27°C D.B., 19°C W.B.;

Outdoor Entering Air Temperature 35°C D.B.

Net Cooling Capacity at AS/NZS 3823 includes an allowance for indoor fan motor heat loss.

() Bracketed figure is performance when matched to digital outdoor unit, ie OSA 310RKTBG.

*2 Heating Capacity (reverse cycle units only) at AS/NZS 3823 conditions:

Indoor Entering Air Temperature 21°C D.B.;

Outdoor Entering Air Temperature 7°C D.B., 6°C W.B.

*3 Supply air flow at Nominal Cooling Capacity conditions stated above.

*4 Power source includes voltage limits.



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