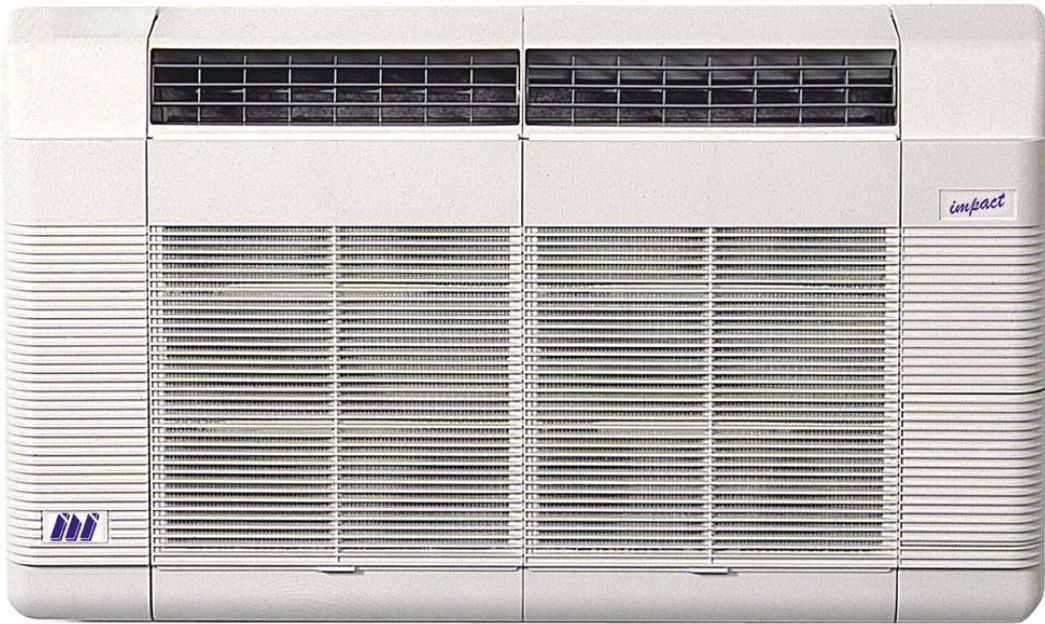


# marstair

## IMPACT / IMPACT E WALL MOUNTED UNITS



## TECHNICAL MANUAL

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## GENERAL

1. TEV Ltd recommend that personnel working on this equipment be skilled and fully conversant with the appropriate Air Conditioning, Refrigeration and Electrical practices and have sound knowledge of current Industrial Safe Working practices.
2. The impact wall mounted range of split systems comprises of 537 series impact wall mounted indoor units, 550 series condensing units and 551 series heat pump outdoor units, or 542 series ducted condensing units and 543 series electronic ducted heat pump units. By choosing appropriate combinations the installer can provide:
  - a. Air conditioners with a cooling range of 1.6 – 9.9 kW.
  - b. Heatpump systems with a cooling range of 2.0 – 8.6kW, and a heating range of 1.9 – 9.4kW with an outdoor temperature of minus 1°C.
3. These units contain live electrical components, moving parts and refrigerant under pressure. Always site out of reach of children and protect from vandalism.
4. The data plate only gives information for the impact unit. For system details add input power and current of indoor and outdoor unit, including any heater load.

## PART NUMBERS

<b>Electromechanical Models</b>	<b>IMPACT 20</b>	<b>IMPACT 40</b>	<b>IMPACT 60</b>
<b>Part Number</b>	53700001	53700002	53700003
<b>Electronic Models</b>	<b>IMPACT 20E</b>	<b>IMPACT 40E</b>	<b>IMPACT 60E</b>
<b>Part Number</b>	53700011	53700012	53700013

**DIMENSIONS AND WEIGHTS** (for dimensions, weights and sizes of outdoor units refer to outdoor unit technical manual)

### IMPACT INDOOR UNITS (unpacked)

Model	IMPACT		
	20(E)	40(E)	60(E)
<b>HEIGHT mm</b>	490	490	490
<b>WIDTH mm</b>	550	850	1150
<b>DEPTH mm</b>	204	204	204
<b>WEIGHT kg</b>	14	18	24

### IMPACT INDOOR UNITS (packed)

Model	IMPACT		
	20(E)	40(E)	60(E)
<b>HEIGHT mm</b>	616	616	616
<b>WIDTH mm</b>	720	1020	1320
<b>DEPTH mm</b>	290	290	290
<b>WEIGHT kg</b>	16	20	27

## FEATURES / ACCESSORIES

	IMPACT	IMPACT (E)
Adjustable air deflectors	<b>STD</b>	<b>STD</b>
De-ice thermostat	*	<b>STD</b>
Electric heating	*	*
Electromechanical thermostat	<b>STD</b>	---
3 fan speeds	<b>STD</b>	<b>STD</b>
Remote hard wired control	---	<b>STD</b>
Remote infrared control	---	<b>STD</b>
Network / Multisplit control	---	<b>STD</b>
Programmable timer	*	<b>STD</b>
Condensate pump	*	*
Long life washable filter	<b>STD</b>	<b>STD</b>
Flame retardant material	<b>STD</b>	<b>STD</b>
High or low level mounting	<b>STD</b>	<b>STD</b>

**KEY:** \* = factory/site option    **STD** = standard    --- = not available

## UNIT COMBINATIONS

AIR CONDITIONING SYSTEMS		HEAT PUMP SYSTEMS	
IMPACT	MCU+ / DCU+	IMPACT	MHPUE / DHPUE
20 (E)	15	20 (E)	15
40 (E)	30 / 40	40 (E)	30
60 (E)	40 / 60	60 (E)	50

## AIR CONDITIONER SYSTEMS AND PERFORMANCE (kw)

IMPACT + MCU+ or DCU+	UK CONDITIONS ROOM 21°C/15°C AMBIENT 27°C/19°C						NEMA (EUROVENT) ROOM 27°C/19°C AMB 35°C/24°C			TROPICAL ROOM 29°C/19°C AMB 46°C/24°C		
	MIN SPEED EVAP			MAX SPEED EVAP			MAX SPEED EVAP			MAX SPEED EVAP		
	TOTAL	SHR	SENS	TOTAL	SHR	SENS	TOTAL	SHR	SENS	TOTAL	SHR	SENS
20(E) + 15	1.4	0.71	1.1	1.9	0.77	1.5	2.1	0.78	1.6	1.6	0.98	1.6
40(E) + 30	2.3	0.77	1.8	3.1	0.83	2.5	3.4	0.84	2.9	2.9	0.96	2.8
40(E) + 40	2.7	0.74	2.0	3.6	0.78	2.8	4.0	0.78	3.1	3.2	0.98	3.1
60(E) + 40	3.0	0.78	2.3	3.9	0.88	3.5	4.4	0.86	3.8	3.7	0.99	3.7
60(E) + 60	3.7	0.74	2.7	5.1	0.80	4.1	5.4	0.81	4.4	4.4	0.98	4.3

For MED speed duties, interpolate between MIN speed and MAX speed duties.

Rating conditions are to BS2852: Part 1: 1982: UK condition C; NEMA condition A; Tropical condition B.

## HEAT PUMP PERFORMANCE

- Cooling, (MAX speed outdoor unit fan). (kW)

IMPACT / MHPUE or DHPUE	UK CONDITIONS						NEMA (EUROVENT)		
	ROOM 21°C/15°C			AMBIENT 27°C/19°C			R27°C/19°C	A35°C/24°C	
	MIN SPEED INDOOR FAN			MAX SPEED INDOOR FAN			MAX SPEED INDOOR FAN		
	TOTAL	SHR	SENS	TOTAL	SHR	SENS	TOTAL	SHR	SENS
20E - 15	1.2	0.75	0.9	1.7	0.81	1.4	2.0	0.78	1.6
40E - 30	2.2	0.78	1.7	3.0	0.83	2.5	3.3	0.85	2.8
60E - 50	3.5	0.72	2.6	4.8	0.82	3.9	5.3	0.81	4.3

- Heating, (room 20°C / 12°C, outdoor unit fan at MAX speed). (kW)

IMPACT / MHPUE or DHPUE	HEATING OUTPUT AT 7°C AMBIENT		HEATING OUTPUT AT -1°C AMBIENT	
	MAX SPEED INDOOR FAN		MAX SPEED INDOOR FAN	
	kW	COP	kW	COP
20E - 15	2.3	2.23	1.9	2.00
40E - 30	4.0	2.78	3.1	2.30
60E - 50	5.4	2.60	4.3	2.20

## OPTIONAL ELECTRIC HEATING

IMPACT	at 230V 50Hz (kW)	at 240V 50Hz (kW)
20(E)	0.7	0.8
40(E)	1.4	1.5
60(E)	2.1	2.25
80(E)	2.75	3.0
100(E)	3.2	3.5

## AIRFLOWS IMPACT UNITS

IMPACT	MIN Speed		MED Speed		MAX Speed	
	CFM	M³/S	CFM	M³/S	CFM	M³/S
20(E)	125	0.06	170	0.08	210	0.10
40(E)	275	0.13	345	0.16	420	0.20
60(E)	360	0.17	440	0.21	645	0.30

# SOUND POWER AND SOUND PRESSURE LEVELS

## IMPACT UNITS

MODEL	SPEED	SOUND POWER LEVELS							SOUND PRESSURE LEVELS	
		Frequency Hz							dBA	NC
		125	250	500	1K	2K	4K	dBA		
20	Min	42.1	48.6	52.2	47.4	40.7	34.8	52.1	31.6	26
	Med	45.5	51.3	54.6	51.8	45.3	39.1	55.6	35.1	30
	Max	48.3	53.9	57.2	55.2	48.8	42.9	58.7	38.2	33
40	Min	45.9	51.4	53.3	51.3	46.9	44.6	55.6	35.1	30
	Med	47.5	53.1	55.4	53.5	48.9	45.8	57.6	37.1	32
	Max	50.7	55.6	58.0	56.6	51.9	48.0	60.4	39.9	35
60	Min	56.4	51.1	52.8	50.2	47.2	42.4	55.2	34.7	27
	Med	56.6	53.0	55.4	52.9	48.6	43.6	57.3	36.8	31
	Max	58.0	57.8	60.3	58.9	53.7	48.9	62.6	42.1	37

Sound Power Levels were obtained in full conformity with BS 4196: Part 5: 1981. Quantities are shown in dB with a standard reference of 1 pW.

Sound Pressure Levels are dB relative to  $2 \times 10^{-5} \text{N/m}^2$  and are calculated from the results under anechoic conditions and are quoted as an average of all points on a hemisphere of a radius of 3m away from the centre of the unit.

## ELECTRICAL DATA

### R407C AIR CONDITIONING SYSTEMS (MCU+)

MODEL COMBINATION	Single Phase Supply 230Volts - 50Hz					Three Phase Supply 400Volts - 50Hz				
	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT
	Cooling	Heating	Cooling	Heating		Cooling	Heating	Cooling	Heating	
	kW	kW	AMPS	AMPS	AMPS	kW	kW	A/PH	A/PH*	A/PH
20(E) + 15	0.9	0.9	6.4	4.0	23	--	--	--	--	--
40(E) + 30	1.4	1.7	8.7	7.6	37	1.4	1.7	4.5	7.6	19
40(E) + 40	1.6	1.7	10.8	7.6	51	1.6	1.7	5.7	7.6	23
60(E) + 40	1.6	2.5	10.9	11.1	51	1.6	2.5	5.8	11.1	23
60(E) + 60	2.5	2.5	10.2	10.8	62	2.5	2.5	4.6	10.8	33

### R407C AIR CONDITIONING SYSTEMS (DCU+)

MODEL COMBINATION	Single Phase Supply 230Volts - 50Hz					Three Phase Supply 400Volts - 50Hz				
	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT
	Cooling	Heating	Cooling	Heating		Cooling	Heating	Cooling	Heating	
	kW	kW	AMPS	AMPS	AMPS	kW	kW	A/PH	A/PH*	A/PH
20(E) + 15	1.3	0.9	6.0	4.0	25	--	--	--	--	--
40(E) + 30	1.8	1.7	8.4	7.6	37	1.8	1.7	3.6	7.6	19
40(E) + 40	2.3	1.7	10.6	7.6	51	2.3	1.7	4.8	7.6	24
60(E) + 40	2.3	2.5	10.7	11.1	51	2.3	2.5	4.9	11.1	24
60(E) + 60	3.1	2.5	14.3	11.1	61	3.1	2.5	6.0	11.1	26

### R407C HEAT PUMP SYSTEMS (MHPUE)

MODEL COMBINATION	Single Phase Supply 230Volts - 50Hz					Three Phase Supply 400Volts - 50Hz				
	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT
	STD. MODEL	+ ELECT Heating	STD. MODEL	+ ELECT Heating		STD. MODEL	+ ELECT Heating	STD. MODEL	+ ELECT Heating	
	kW	kW	AMPS	AMPS	AMPS	kW	kW	A/PH	A/PH*	A/PH
20(E) + 15	0.9	1.7	6.4	9.9	31	--	--	--	--	--
40(E) + 30	1.4	3.0	8.7	15.7	42	1.4	3.0	4.5	11.5	26
60(E) + 50	2.1	4.5	9.5	19.9	61	2.1	4.5	4.6	15.0	33

\* Max Phase

## R407C HEAT PUMP SYSTEMS (DHPUE)

MODEL COMBINATION	Single Phase Supply 230Volts - 50Hz					Three Phase Supply 400Volts - 50Hz				
	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT	INPUT		FULL LOAD AMPS		SYSTEM MAX. STARTING CURRENT
	STD. MODEL	+ ELECT Heating	STD. MODEL	+ ELECT Heating		STD. MODEL	+ ELECT Heating	STD. MODEL	+ ELECT Heating	
IMPACT + DHPUE	kW	kW	AMPS	AMPS	AMPS	kW	kW	A/PH	A/PH*	A/PH
20(E) + 15	1.3	2.2	4.6	8.1	23	--	--	--	--	--
40(E) + 30	1.8	3.5	9.1	16.1	46	1.7	3.5	3.9	10.9	28
60(E) + 50	2.5	5.0	11.7	22.1	65	2.5	5.0	5.3	15.7	38

\* Max Phase

## ELECTRICAL LOADS (230V 50Hz 1Ph, A or 400V 50Hz 3PhN, A/Ph)

### IMPACT

	20E	40E	60E
FAN MOTOR	0.2	0.3	0.4
ELECTRIC HEATER (AIR COND.)	3.5	7	10.4
ELECTRIC HEATER (HEAT PUMPS)	3.5	7	10.4

### FUSES

The system and its supply/interconnecting wiring must be protected by fuses, preferably High Rupture Current (HRC) motor rated types (EN60269) or miniature circuit breakers (EN60898) or local codes having similar time lag characteristics, that allow starting of the compressor yet still afford close overcurrent protection under running conditions. The ratings below are for HRC motor rated fuses.

### FUSES FOR SYSTEMS WITH SINGLE PHASE (230V) OUTDOOR UNITS (A)

IMPACT (E)						
MCU+ or DCU+	20		40		60	
	S	H	S	H	S	H
15	16	16				
30			16	16		
40			20	20	20	20
60					20	20
MHPUE or DHPUE	S	H	S	H	S	H
30			10	16		
50					20	20

S = Standard H = Heaters

### FUSES FOR SYSTEMS WITH THREE PHASE (400V) OUTDOOR UNITS (A/Ph)

IMPACT (E)				
MCU+ or DCU+	40		60	
	S	H	S	H
30	10	10		
40	10	10	16	16
60			10	16
MHPUE or DHPUE	S	H	S	H
30	10	16		
50			10	16

S = Standard H = Heaters

## SEPARATE SUPPLIES TO ELECTRONIC INDOOR AND OUTDOOR UNITS (A) HEAT PUMP SYSTEMS ONLY

It is recommended that systems using electronic indoor AND outdoor units should be independently fused.

**NOTE THAT THESE SUPPLIES MUST BE TAKEN FROM THE SAME PHASE**

	IMPACT E		
	20	40	60
1Ph Cool Only	5	5	5
1Ph Cool and Heat	5	10	10

OUTDOOR UNIT	MHPUE 15 DHPUE 15	MHPUE 30 DHPUE 30	MHPUE 50 DHPUE 50
1Ph (A)	10	16	20
3Ph (A/Ph)	---	10	10

## IMPACT (E) WALL MOUNTED UNIT INSTALLATION

The installer supplies:

- 4 off M6 (or equivalent strength) Rawlbolt shields, bolts and washers.
- Fully insulated refrigeration pipework.
- All mains wiring with suitable isolation; Interconnecting wires for indoor and outdoor units.
- Condensate drain (minimum 10mm bore for gravity drain, 8mm bore for condensate pump drain).
- Two spanners for securing the flare connectors.
- A cross-headed screwdriver for releasing the end cover fasteners.
- A 4 or 5mm Allen key for opening the outdoor/ducted unit valves (depending on valve type).
- Method for securing solid sheathed cables if these are used.

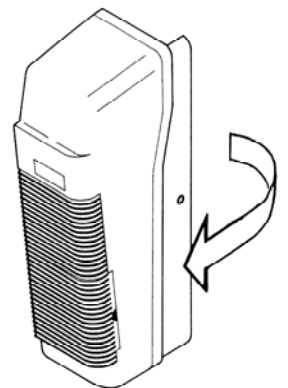
### Unpacking

Carefully unfasten the banding and lift off the outer cardboard carton sleeve.

The following are supplied:

- IMPACT unit (in protective sleeve, held between two polystyrene end caps).
- A cardboard sleeve containing two pipe assemblies complete with insulation and two cable glands suitable for flexible, p.v.c. sheathed cable.
- A wall-mounting bracket also held between the two polystyrene end caps.
- Envelope containing operating instructions to be left with the end user.
- IMPACT E models also have an electronic remote control assembly incorporating the infrared controller, wall mounting bracket, two screws and wall plugs and a battery.

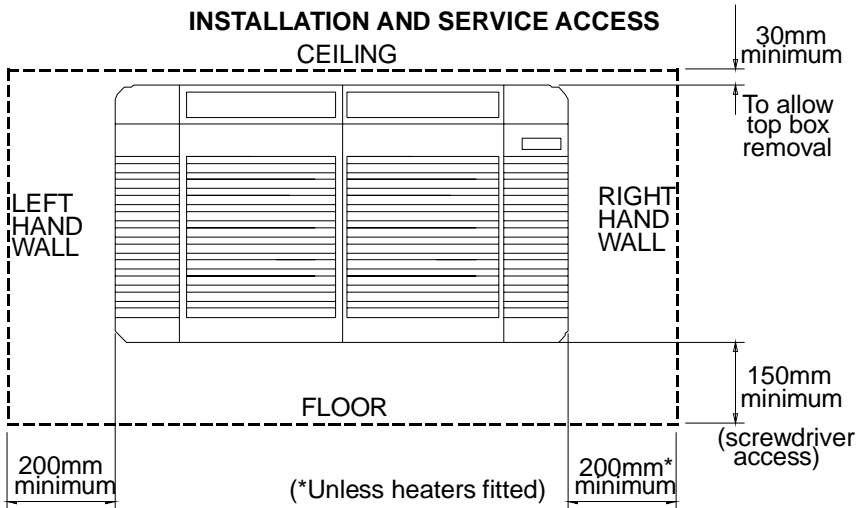
- 1 Remove and place to one side the cardboard sleeve containing the two pipe assemblies, (and remote control assembly on IMPACT E models).
- 2 Lift the IMPACT unit from the inner cardboard sleeve complete with the two polystyrene end caps; (this will require 2 people for sizes 60 to 100).
- 3 Remove the wall-mounting bracket and carefully remove the two polystyrene end caps and the protective sleeve from the IMPACT unit.
- 4 Remove both end covers by removing the self-tapping screws, one on each end trim. By pulling the end covers sharply they can be removed from the backpanel and fascia.



## Chassis Mounting

**NOTE:** It is generally easier to fit kits prior to mounting the unit and connecting the pipework. It is essential to fit a heater kit at this stage if right hand side access will be limited to less than the unit width.

- 1 Ensure that the wall is flat and will support the operating weight of the unit, (see below)
- 2 Ensure that sufficient access is left around the unit for future kit fitting, servicing and maintenance.



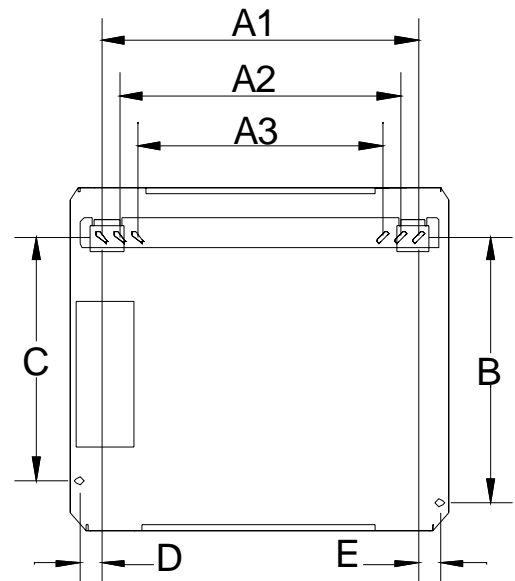
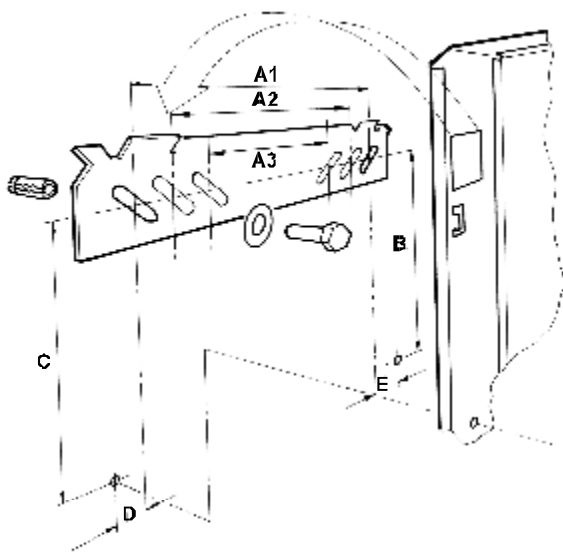
Model	Weight kg	Operating Weight kg
20(E)	14	15
40(E)	18	21
60(E)	24	25

*\*Includes all kits and refrigerant*

**\*Removal or replacement of heater elements requires a clearance at the right hand side equal to the length of the unit**

- 3 Mark out the two required top-hole centres as shown in Fig. 2, (note that the top of the IMPACT unit will be approximately 100mm above the level of the hole centres). Drill to suit M6 Rawlbolt shields or equivalent strength fasteners. Secure the wall-mounting bracket to the upper two holes ensuring that it is level.
- 4 Hang the unit on the two protrusions from the wall mounting bracket and, ensuring that the unit is level, mark out and drill the lower two holes and secure the unit to the wall.

Model	20E	40E	60E
A1	445	745	1045
A2	395	695	995
A3	345	645	945
B	370	370	370
C	340	340	340
D	31	31	31
E	29	29	29



## Condensate Removal

Condensate collects in a drip tray along the full length of the coil.

An outlet pipe is provided at the rear left hand end of the tray for connection to a pipe for gravity drain.

Slide the outlet pipe from the clip and exit the unit vertically through the hole in the backpanel or base tray.

The drain stub has a 14mm o.d. barb and is supplied with connector and a short length of 6.35mm i.d. hose

For connection to a 10-12mm i.d. flexible hose, remove the hose and connector supplied and connect directly to the stub.

**Ensure that the drain pipe is kept below the rim of the drip tray along its entire length.**

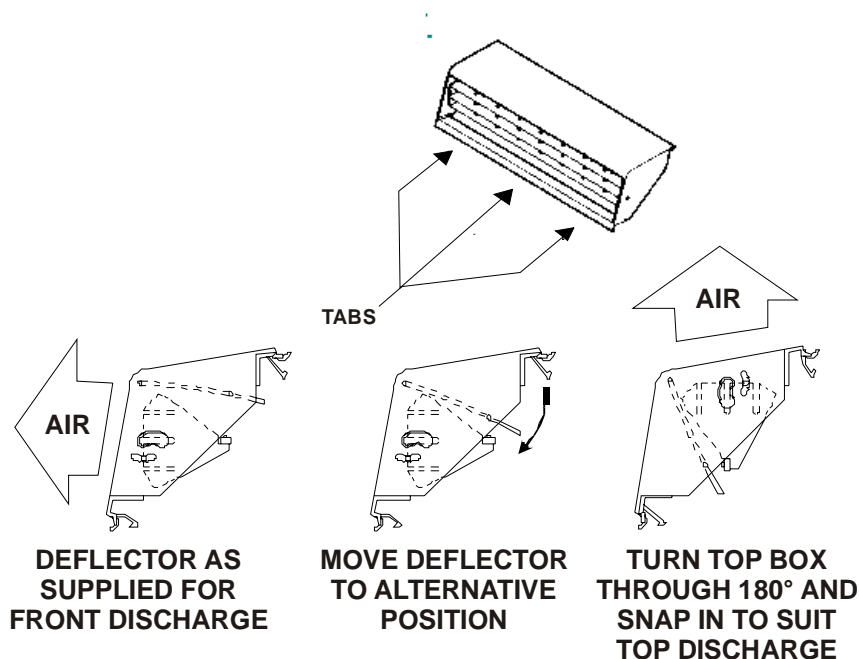
Once a gravity drain has been installed, check to ensure that the pipe is not kinked and that correct drainage occurs by slowly filling the drip tray with water.

A condensate pump kit (incorporating overflow protection) can be fitted within the unit to enable a lift of up to 5m.

## Air Deflection

Air deflection is set by manually adjusting the vanes. The unit is supplied with front discharge but can be changed to top discharge as follows.

- 1 Remove the filters.
- 2 Remove the end covers.
- 3 Using a screwdriver or thin bladed tool, release the three tabs at the bottom of the top box; these are directly below the centre and two end vertical vanes.
- 4 Lift the top box assembly from the unit.
- 5 By gently flexing the top box sides from the rear, transfer the deflector plate from the upper to the lower two fixing holes.
- 6 Rotate the top box assembly and refit to give top discharge.



## APPLICATION

- 1 To maximise performance, pipe runs should be kept as short as possible, avoiding sharp bends. However, individual pipe runs to a maximum of 80m, including 20m lift, are permissible provided good refrigeration practice is followed.  
Published performance duties are based on 7.5m pipe runs. Correctly sized pipes for each installation, and fitting the correct expansion orifice (restrictor) will result in no significant loss of capacity on extended pipe runs.
  - a) Pipe sizes are based on: -  
Minimum of 3.8 m/s (750 fpm) suction gas velocity for horizontal or downflow.  
Minimum of 7.6 m/s (1500 fpm) suction gas velocity for upflow.  
Maximum of 15.2 m/s (3000 fpm) suction gas.
  - b) Where vertical risers exceed 3m, oil traps must be formed in the pipe. This will help ensure that oil returns to the compressor. Typically fit an oil trap every 3m with a trap at the bottom of the riser.
- 2 Add 25 grams of polyolester (POE) oil for every 350 grams of charge added to systems with pipe runs exceeding 25m, up to a maximum of 300 grams; preferably by slowly pumping into the suction side with the unit running, after charging the system.
- 3 The maximum pipe lengths to be used for each pipe size and outdoor unit are shown in the table below. Use of these sizes and lengths is recommended in order to achieve optimum system performance.
- 4 In calculating equivalent lengths of pipe runs, the effect of bends and fittings must be taken into account. The table below covers the fittings most likely to be encountered in this type of installation. The equivalent lengths of all the fittings in a particular pipe run must be added together and the total added to the actual length of pipe in the run, in order to calculate the total equivalent length.

**FITTING LOSSES**, in equivalent straight lengths of pipe (metres).

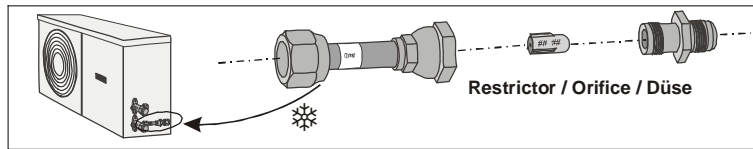
Fitting	Pipe Size (outside diameter in inches)					
	3/8	1/2	5/8	3/4	7/8	1-1/8
45° Bend	0.12	0.15	0.18	0.21	0.24	0.3
90° Bend R/d = 1	0.37	0.43	0.49	0.55	0.61	0.79
90° Bend R/d = 1.5	0.24	0.27	0.30	0.37	0.43	0.52
180° Bend C/d =	0.73	0.91	1.10	1.28	1.46	1.83
180° Bend C/d =	0.46	0.55	0.64	0.76	0.85	1.07
90° Elbow	0.67	0.85	1.04	1.25	1.46	1.89
R = Radius of bend		d = Diameter of tube		C = Centres of		

- 5 Use the shortest possible route, avoiding sharp bends.
- 6 Fully insulate **both** the suction and expansion lines, including the expansion device, since both lines may sweat.

# RESTRICTOR MATCHES

Outdoor units are supplied with cooling restrictors fitted in the expansion assembly; refer to the following tables for any restrictor changes. Those ticked do not require a change of restrictor. Where appropriate, the alternative cooling or heating restrictor is supplied with either the indoor or the outdoor unit

SYSTEM MATCH	PIPE CONNS		MAXIMUM PIPE RUNS (m)									COOLING RESTRICTOR			CHARGE TO ADD (for 7.5m) <sup>(1)</sup>				
	SUC	EXP	SUCTION						EXPANSION			MCU+		DCU+					
			3/8	1/2	5/8	3/4	7/8	11/8	3/8	1/2	5/8	UK	NEMA	UK + NEMA	UK (g)	NEMA (g)			
IMPACT 20	3/8	3/8																	
MCU+15/ DCU+ 15	3/8	3/8	7.5	30	50					50				033	035	032	200	230	
IMPACT 40	1/2	3/8																	
MCU+30/ DCU+ 30	1/2	3/8		15	50	80				50	80			040	042	039	0	60	
IMPACT 40	1/2	3/8																	
MCU+40/ DCU+ 40	1/2	3/8		10	36	80				7.5	80			042	044	041	140	240	
IMPACT 60	5/8	3/8																	
MCU+40/ DCU+ 40	1/2	3/8		10	36	80				7.5	80			042	044	043	200	300	
IMPACT 60	5/8	3/8																	
MCU+60/ DCU+ 60	5/8	3/8			14	36	80			7.5	50	80		051	053	050	0	635	



## HEAT PUMP SYSTEMS (ALL CONDITIONS)

Heat pumps are supplied with a heating restrictor in an expansion assembly. This must be fitted close to the indoor unit in the expansion line, (smaller of two connections) arrows pointing in the direction of the outdoor unit.

✓ = NO RESTRICTOR CHANGE NEEDED

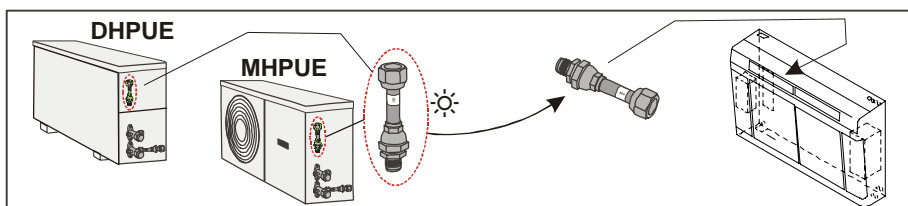
MHPUE	IMPACT	Cooling restrictor Fitted to the outdoor unit
15	20	033
30	40	040
50	60	052
DHPUE	IMPACT	Cooling restrictor Fitted to the outdoor unit
15	20	032
30	40	039
50	60	049

Heat pump cooling conditions	
UK CONDITIONS	NEMA CONDITIONS
✓	035
✓	042
✓	✓

Heating restrictor fitted to the outdoor expansion assembly	
035	
039	
044	

Heat pump cooling conditions	
UK CONDITIONS	NEMA CONDITIONS
✓	✓
✓	✓
✓	✓

027
037
044



# PIPE CONNECTIONS

## IMPACT UNITS

Pipework is terminated at the left hand side of the unit. Two pipe assemblies are supplied loose with flare nut connectors to enable pipe exit from either the top or bottom of the unit via knockouts. Rear pipe exit is possible with installer supplied pipework.

Always use two spanners to secure the flare connections to avoid distorting and damaging the pipework. Pipe flare connections (in inches) are;

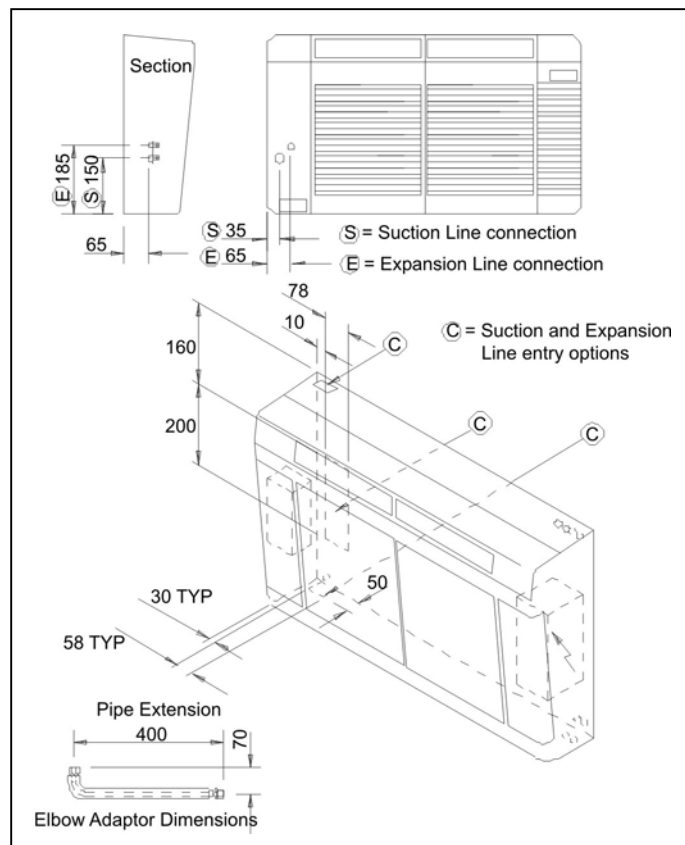
IMPACT Model	20(E)	40(E)	60(E)
Expansion Pipe	3/8	3/8	3/8
Suction Pipe	3/8	1/2	5/8

- 1 If top or bottom pipe exit is required, remove the appropriate knockout in the backpanel flanges.
- 2 Remove and retain the flare nuts from the coil, (the bonnets should be discarded).
- 3 Screw the angled ends of the pipe extensions to the male connectors on the coil, ensuring that the straight ends extend through the knockout.

For pipe exit through the rear of the unit, the installer must supply appropriately flared pipework.

**On heat pump systems the IMPACT unit needs to have an expansion assembly fitted; refer to the next section.**

- 4 Interconnecting pipework should be installed in accordance with good refrigeration practice.
- 5 Final connection is made to the male flare connectors, either on the pipe extensions (for top or bottom entry) or directly onto the coil (for rear entry).
- 6 Care should be taken to ensure that pipe flares are correctly formed and have undamaged seating surfaces. The use of a little oil on the flaring tool will help. **DO NOT FORGET** to fit the flare nut onto the pipe **BEFORE** flaring it.
- 7 Make the flare connections to IMPACT using a little refrigeration oil on the mating surfaces. Always use two spanners in opposing directions to avoid twisting the pipework and damaging the coil connections.



## ELECTRICAL CONNECTIONS

- 1 Mains, control and interconnecting cables must be supplied and fitted by the installer.
- 2 Installer wiring must be carried out in accordance with IEE regulations and local codes. **Refer to the interconnecting wiring diagrams on pages 30 to 34.**
- 3 Mains supply cables must be size compatible with the recommended fuse for a given system (see pages 11 and 12).
- 4 An all pole isolator switch should be positioned within easy reach of the indoor unit.
- 5 The equipment must be earthed.
- 6 Cable clamps for use with stranded cables are supplied in units 15 - 90 and should be used to secure all incoming/outgoing cables. Installers must supply a method of securing any solid sheathed cables.

## ELECTROMECHANICAL SYSTEMS

Systems including an electromechanical unit require a supply to the condensing unit with connecting cables run to the indoor unit

## ELECTRONIC SYSTEMS (DCU+, DHPUE and MHPUE):

It is recommended that systems with electronic indoor **AND** electronic outdoor units have a supply taken to the outdoor unit **AND** a separate supply taken to the indoor unit, which in many cases can be from a domestic 13 Amp socket, (see fuse ratings on pages 11 and 12), otherwise run a supply to the outdoor unit with connecting cables run to the indoor unit.

Communication between the indoor and outdoor unit is via a two wire (max. 0.75mm<sup>2</sup>) non-polarised connection (installer supplied), using cable type RS 485 or equivalent, (or two cores of 00526077, 4 core cable, available from TEV Ltd).

**The cable screen should be secured to ground (earth) at BOTH ends using the clamps provided. Do not attempt to run the communication in the spare cores of any power carrying cable.**

**Whenever possible, the communication cable should be run separate from any mains cable.**

## DATA PLATES

Because of the ability to mix-match indoor and outdoor units, the data plate only gives information on outdoor units. To obtain the system details, input power and currents from indoor and outdoor units should be added together. Data plates show basic units with electric heater kit loads shown separately.

## FIRE LINK

In order to automatically switch off the fan in the event of a fire, it is necessary to fit an external switch (240V, 3A, closed to run, volt free contact) in series with the small black wire connected to the bottom terminal of the fuse. This switch should be operated by the building's fire alarm or BMS system.

## EVACUATING

1. Connect a vacuum pump to the service ports on the outdoor unit valves and evacuate the interconnecting pipework and indoor unit to 1000 microns (1 Torr) or better and allow to be held for a minimum of 15 minutes.
2. **If NO additional refrigerant charge is required:** Replace the caps on the service ports, (tighten to a torque of 25NM), and open the valves using a 4 or 5mm Allen key. On electronic units, **REMOVE** link **JP6** identified by a white label, (otherwise the unit will always run at full speed).

## ADDING REFRIGERANT

**1 If additional refrigerant charge is required:**

After evacuating the indoor unit and interconnecting pipework, open the valves using a 4 or 5mm Allen key. The high and low side pressures should equalise within a minute.

**2** Additional charge for all systems, including heat pumps, should be introduced with the system in the **AIR CONDITIONING MODE**.

**3** Additional charge should be introduced through the Schrader valve on the indoor unit or the service port on the suction service valve on the outdoor unit (see charging section overleaf to calculate the weight).

**4 DCUE, DHPUE and MHPUE** are supplied with link JP6 fitted on the outdoor unit pcba; this allows additional charging and overrides alarms during the charging process. With both units powered, the **DCUE, DHPUE or MHPUE** fans will run at high speed and **IMPACT E** indoor fans will run at maximum speed. When JP6 is linked, the infrared handset is inoperative.

**NOTE:** **MCU+** units are fitted with head pressure control; before charging, isolate the unit and transfer the blue



**5** Ensure that the refrigerant being added is the same refrigerant that the system was originally charged with.

**6** If a manual HP cutout is fitted, ensure that the reset button is depressed.

**7** On DCUE, DHPUE and MHPUE models a random start delay of up to 1 minute occurs when mains is first applied. A 3 minute delay occurs between successive compressor operations on all systems incorporating DCUE, DHPUE and MHPUE units, or MCU(+) units fitted with a 3 minute timer kit.

**8** Run the system for a few minutes to allow it to stabilize. Where possible, charge to a sweat line on the evaporator. Typical suction pressures on short lines at UK conditions, with high speed evaporator fan, low speed condenser fan (commissioning speed for DCUE, DHPUE and MHPUE), should be; Electromechanical Comfort Systems approx. 4.4 bar (65 psig); Electronic Comfort Systems approx. 3.8 bar (55 psig); Heat Pump Systems approx. 4.0 bar (58 psig).

Care should be taken when the compressor is first started in the field to ensure that the system is not overcharged, in which case liquid return to the compressor could result.

**9** On **DCUE, DHPUE and MHPUE** units, once refrigerant has been added, **REMOVE** link **JP6**, identified by a white label (otherwise the unit will always run at full speed).

**10.** On **MCU+** units, return the blue wire from 1 to 4.



### WHEN INSTALLATION HAS BEEN COMPLETED - CHECK :-

1. All pipe work and joints for leakage.
2. All pipe work and fittings for insulation.
3. All bolts are secure and that the fan rotates freely.

### CHARGING

#### **IMPACT WALL MOUNTED SYSTEMS - pipe runs below 7.5m.**

Each outdoor unit is charged with R22 or R407C as shown on page 18.

Where additional refrigerant is needed this is shown on P18. **Additional oil is not required.**

#### **IMPACT WALL MOUNTED SYSTEMS - pipe runs over 7.5m.**

For pipe runs over 7.5m, extra refrigerant and oil must be added to the system by the installation engineer as shown on page 18 **PLUS** additional refrigerant and oil for each metre over 7.5m, based on the following:

Expansion line size.	3/8	1/2	5/8
Additional refrigerant (g/m)	16	30	48
Additional oil	25g per 350g of additional refrigerant to a maximum of 300g		

# INSTALLATION of the IMPACT E REMOTE CONTROLLER

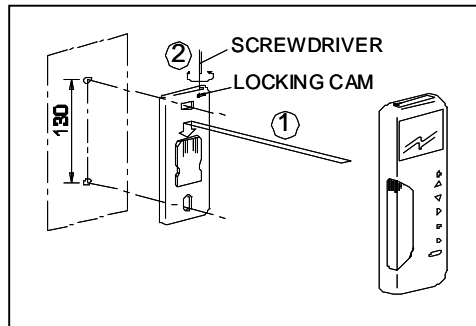
IMPACT E indoor units are supplied with a remote controller, wall mounting bracket, PP3 (9 volt) battery, screws and wall plugs.

The controller either operates remotely by infrared signals, when the bracket may be used to park the controller for convenience, or may be hard wired to the unit (via the wall mounting bracket) in applications where infrared is inappropriate, e.g., high lighting level, no direct line of sight etc.

## 1. Infrared operation

Open the battery cover at the bottom rear of the controller by sliding out and hinging up, push the polarised connector onto the battery, slot into the controller and close the cover. The controller is now ready for operation as stated in the user handbook.

For convenience, the wall-mounting bracket may be secured to a wall and used to park the controller.



## 2. Hard wired

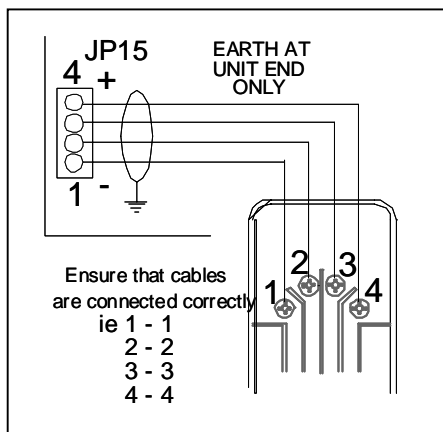
Use four core screened cable available from TEV Ltd in 100m drums, part number 00526117. The screen should be clamped to ground in the IMPACT E unit but **NOT** connected at the wall bracket end.

**NOTE: Great care should be taken to ensure that the wiring is correct, refer to the diagram below**

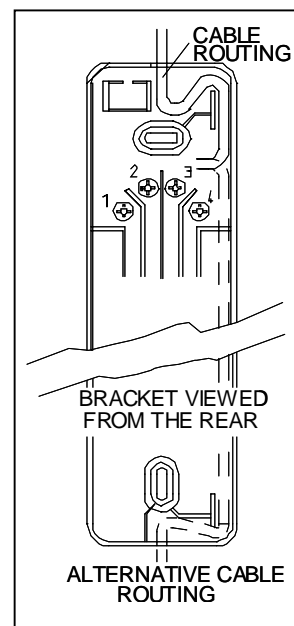
The cable should be connected prior to mounting the bracket, taking great care to ensure that the 4 contact blades remain free to exert spring pressure on the handset terminals.

Secure the bracket to the wall by drilling two 6mm diameter holes in the positions shown, inserting the wall plugs and securing with the two screws provided. Attach the controller to the bracket ensuring that it is pushed down firmly.

If required, the controller may be locked into position by rotating the cam at the top of the bracket with a small screwdriver. The controller is now ready for operating as stated in the user handbook. The controller does not require a battery when this method is used.

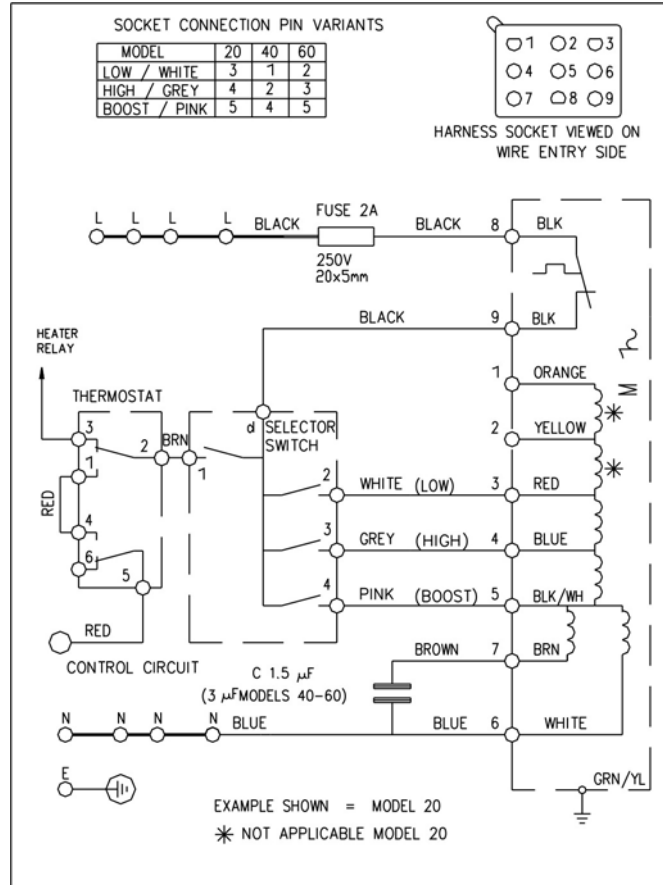


Ensure cables are correctly connected

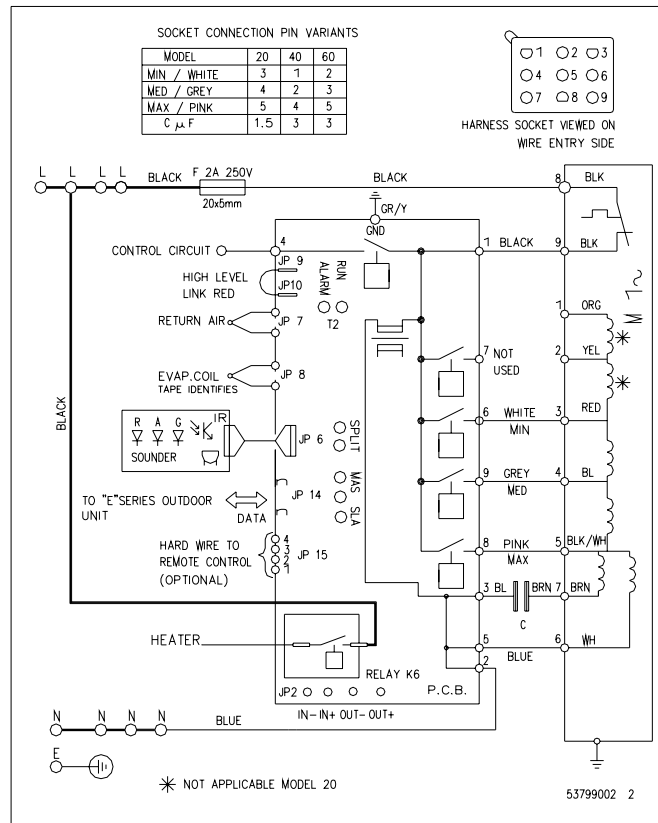


# WIRING DIAGRAMS

## ELECTROMECHANICAL IMPACT

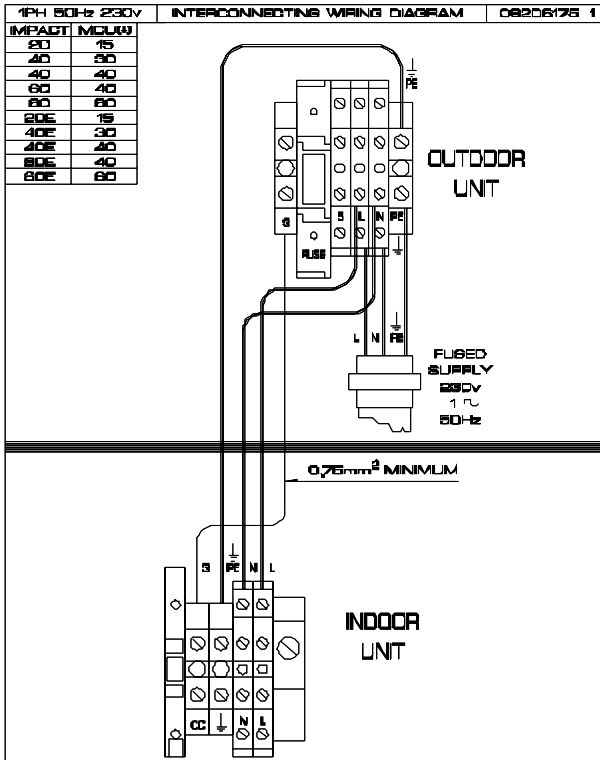


## ELECTRONIC IMPACT E

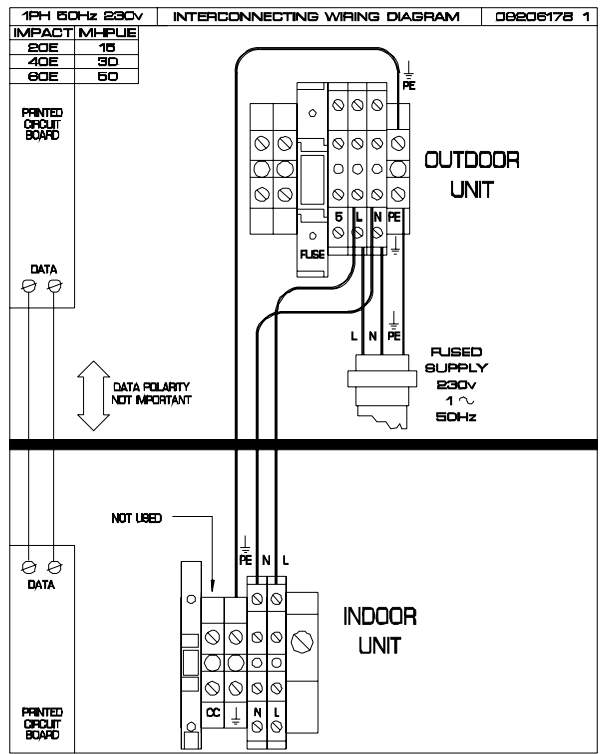


# INTERCONNECTING WIRING DIAGRAMS

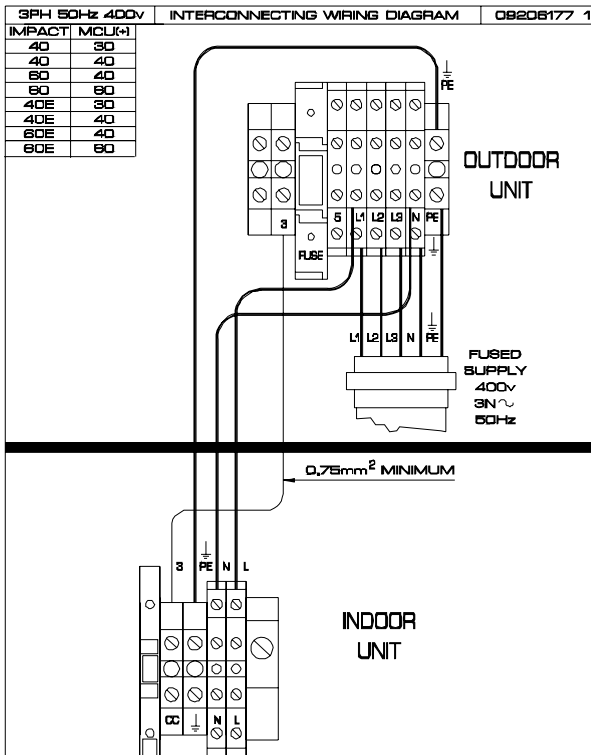
20(E) - 60(E) + 1 Phase MCU+ 15 - 60



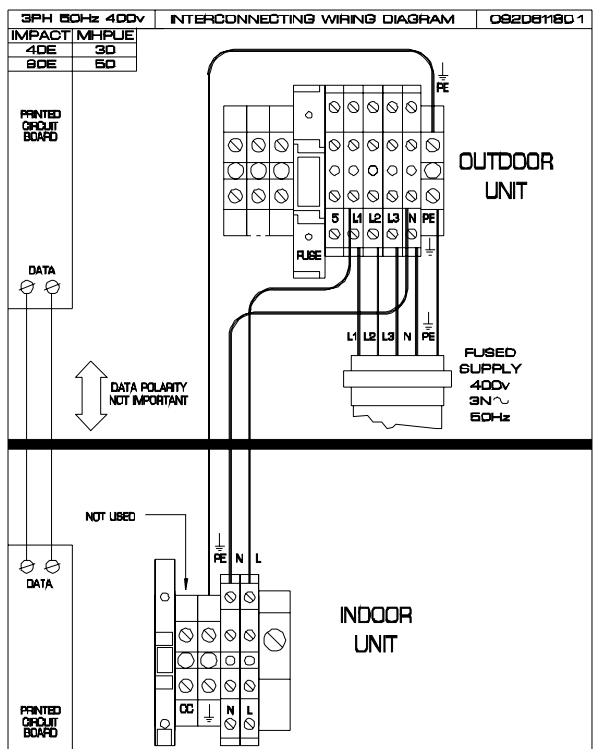
20E - 60E + 1 Phase MHPUE 15 - 50



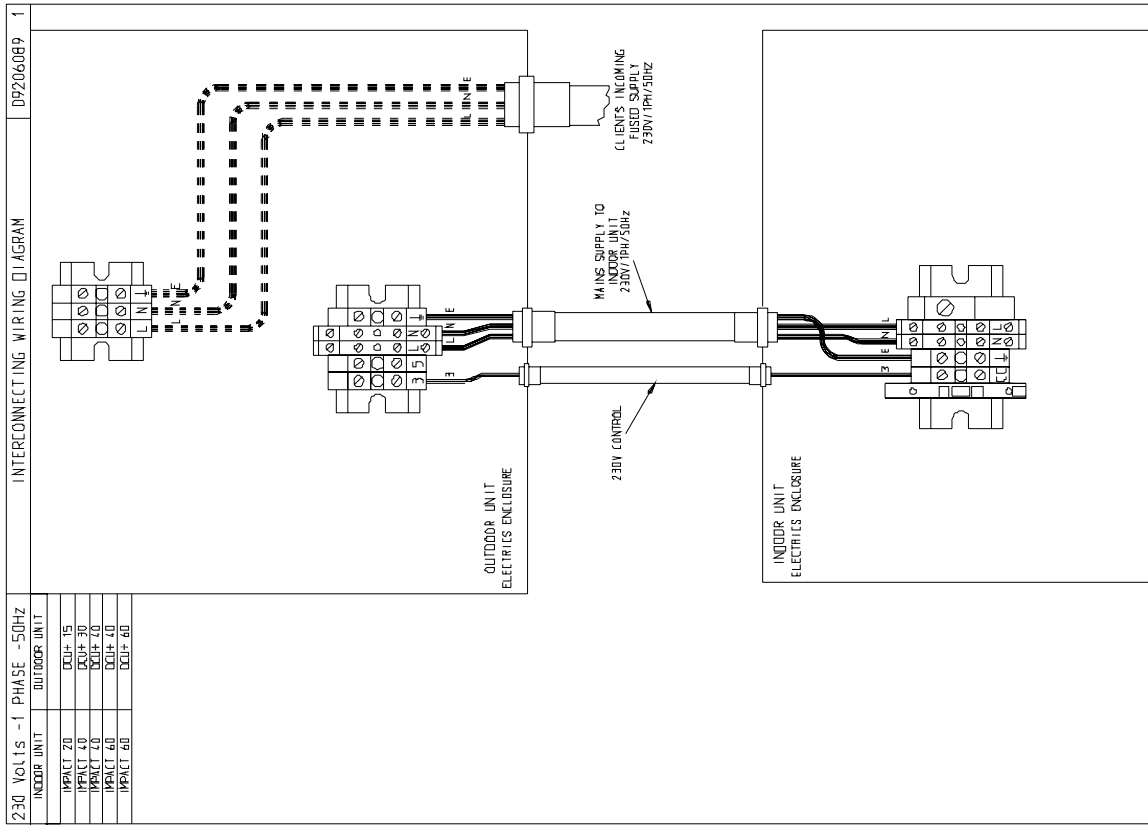
40(E) - 60(E) + 3 Phase MCU(+) 30 - 60



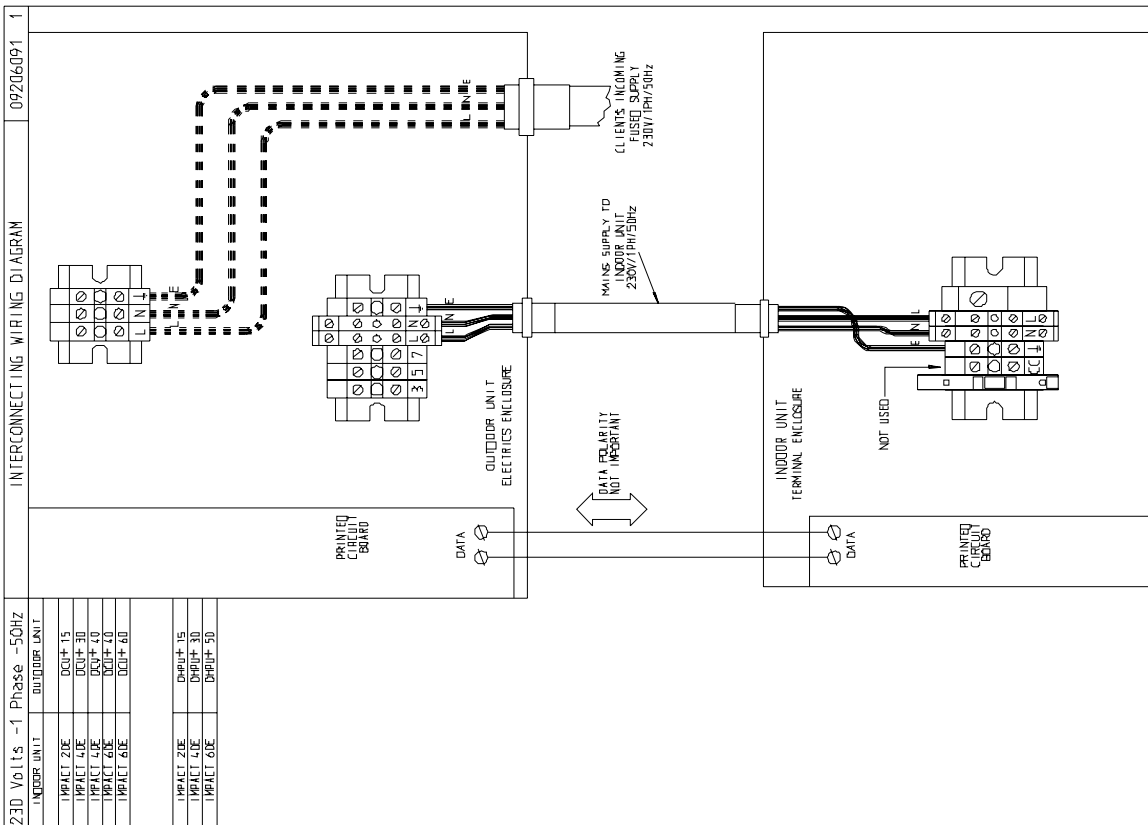
40E - 60E + 3 Phase MHPUE 30 - 50



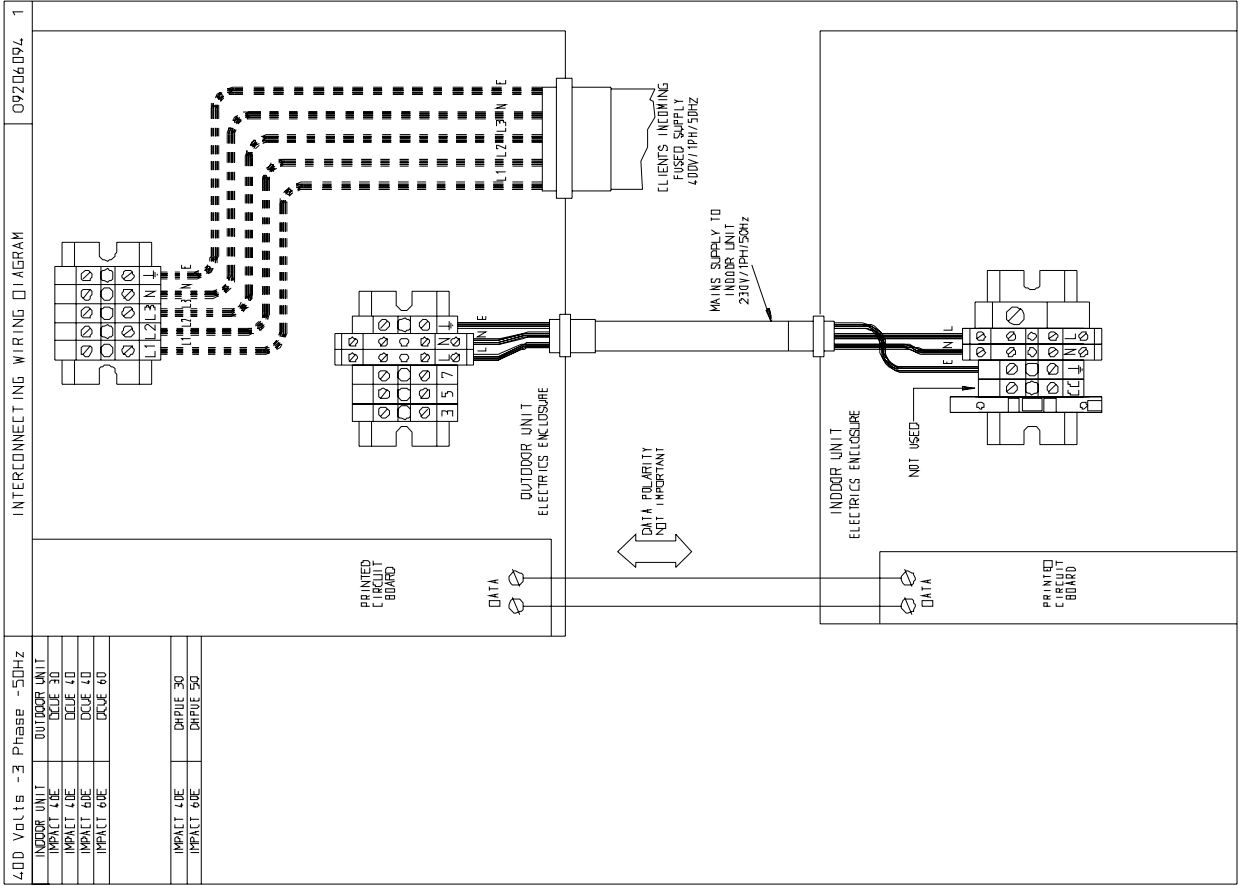
IMPACT 20 –60 and 1 PHASE DCU+ 15 – 60



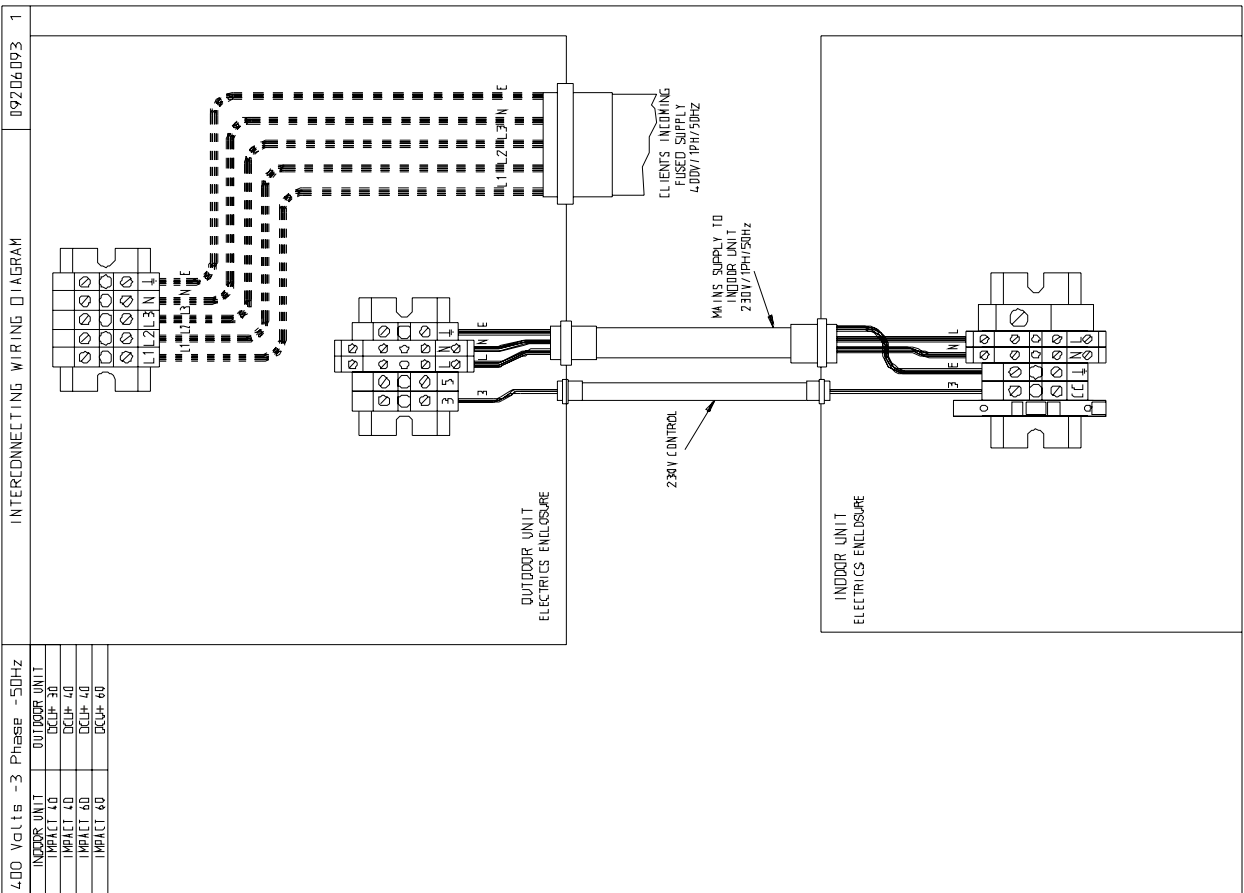
IMPACT 20E – 60E and 1 PHASE DCU+/DHPUE 15 - 60



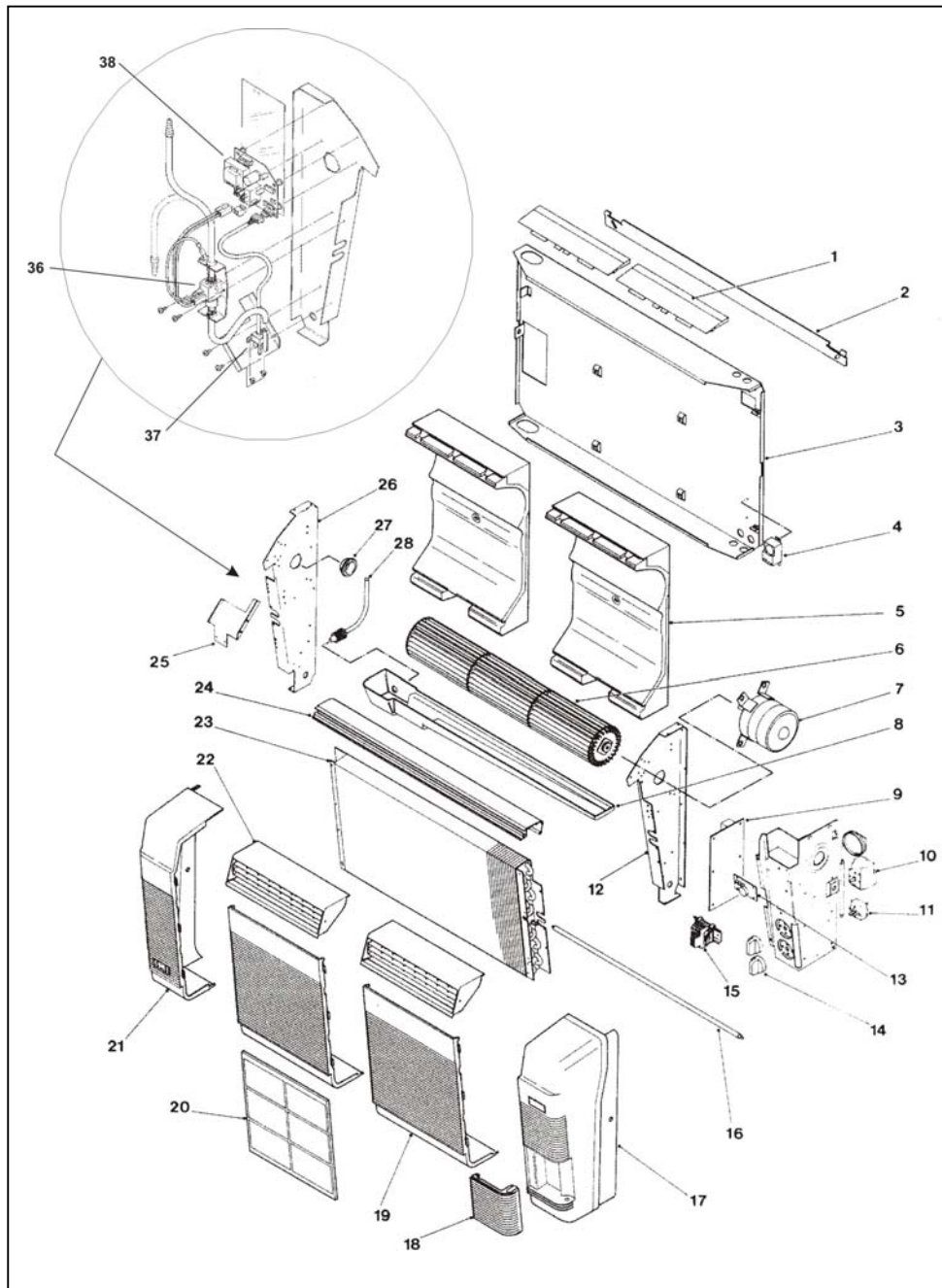
IMPACT 40 - 60 and 3 Phase DCU+ 30 - 60



IMPACT 40E - 60E and 3 Phase DCU+/DHPUE 30 - 60



**EXPLODED DIAGRAM OF IMPACT WITH COMPONENT IDENTIFICATION (IMPACT 40 SHOWN)**



1	Top cover plate	15	Terminal assembly	29	Heater cut-out assembly
2	Wall mounting bracket	16	Heater element	30	Electrics plate
3	Back panel	17	Right hand end cover	31	Capacitor
4	De-ice thermostat	18	Right hand door cover	32	Blank cover (electromechanical)
5	Polystyrene scroll	19	Front cover	33	LED cover (electronic)
6	Impeller	20	Filter	34	De-Ice sensor (electronic)
7	Motor	21	Left hand end cover	35	Return air sensor (electronic)
8	Drip tray assembly	22	Top box assembly	36	Condensate pump
9	Power board (electronic)	23	Coil and header	37	Condensate pump sensor
10	Thermostat (e/mechanical)	24	Extrusion	38	Condensate pump PCB
11	Rotary switch (electromechanical)	25	Drip deflector		Remote controller (not shown) shown)
12	Right hand coil bracket	26	Left hand coil bracket		2 Amp fuse (not shown)
13	Receiver board (electronic)	27	Rubber housing		Heater relay (not shown)
14	Rotary knob (Electromechanical)	28	Impeller spring		