



DCS / FCS Close Control Chilled Water Units



Engineering Data Manual 50/60Hz

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HISTORY

Formed in 1968, EDPAC has grown through worldwide distribution to an installed base of over 50,000 units. EDPAC currently services the markets of Europe, the Americas, the Middle East, and the Far East. As one of the pioneers of Precision Air Conditioning the EDPAC name has become synonymous with quality and reliability. With its highly skilled and experienced team EDPAC has established not only a modern manufacturing plant, but also a sophisticated and innovative product development programme. Since 1987 EDPAC International located in Cork Ireland, has controlled the entire activities of the group.

PRODUCT RANGE

EDPAC manufactures a broad range of Precision Air Conditioning equipment for the Computer Room, Telecoms and Building Services applications. EDPAC systems are designed to provide optimum operating conditions in close control environments. Control is microprocessor based with installations ranging from single units to multiple units on BMS networks..

QUALITY

All suppliers of materials and components used in manufacturing are assessed and qualified by EDPAC. The EDPAC guarantee of quality is also complimented by rigorous in-factory quality assessment and quality control testing prior to product dispatch. The overall activity of the factory is customer focused and conforms to the strict norms of IS/ISO9001/EN29001. EDPAC was awarded and has retained this certificate since 18th March, 1992.

THIS PRODUCT RANGE

DCS / FCS CHILLED WATER UNITS

The DCS/FCS range of close control Chilled Water units comprises 4 sizes providing nominal capacities of 60, 80, 100 & 120 kW. Units are available in Upflow and Downflow configurations with top, bottom, front and rear return options. The range of units is ideal for very large data centre applications where Air Cooled or Water/Glycol Cooled Units would be impractical due to the size of the building close control cooling load. As standard the DCS/FCS range of Close Control Chilled Water units are equipped with: G4 Filtration, 2 or 3 Port Control Valve, Humidifier, Electric Reheat, Twin Belt driven forward curved Centrifugal Fans and the latest Delta range of DIN rail mounted Microprocessor Controllers. The DCS/FCS range has an option also for backward curved EC plug fans which offer tremendous savings in fan power due to the fan/motor efficiency & the control options available in running the fans smartly in the modern data centre. Other options available include: Water Leak Detection, Autosequence/Autorotate, 3 Way Discharge Plenums, Graphic Display, Drain Trap, Smoke Detection, Fire Detection, Floorstand, loss of Chilled Water Flow Switch, Condensate Pumps & many more items. BMS interface cards are available for all of the most commonly-used protocols including but not limited to MODBUS, BACnet, LON, JCI METASYS & they all can be integrated into most BMS systems by RS 485 or over TCP/IP.

ASSOCIATED PRODUCT RANGES

CLOSE CONTROL MODULAR UNITS

The Close Control Modular range is comprised of 4 module sizes providing nominal capacities of 10, 15, 20, 25, 30, 35 & 40 kW per module. These modules form the basis of the EDPAC modular concept. Unit selections can be based on a single module for a single circuit system or any combination of 2 modules to give a twin circuit or Duplex system. The Duplex configuration is advantageous as both modules can be positioned at different locations within the room.

CLOSE CONTROL AIR COOLED TWIN CIRCUIT UNITS

The Close Control Twin Circuit range comprises 4 sizes providing nominal capacities of 30, 40, 50, 60, 70, 80 & 100 kW. Units are twin circuit in a single frame and are available in Upflow and Downflow configurations. Cooling is by air cooled direct expansion only. There is an option for a dual cooling version with the addition of a chilled water coil.

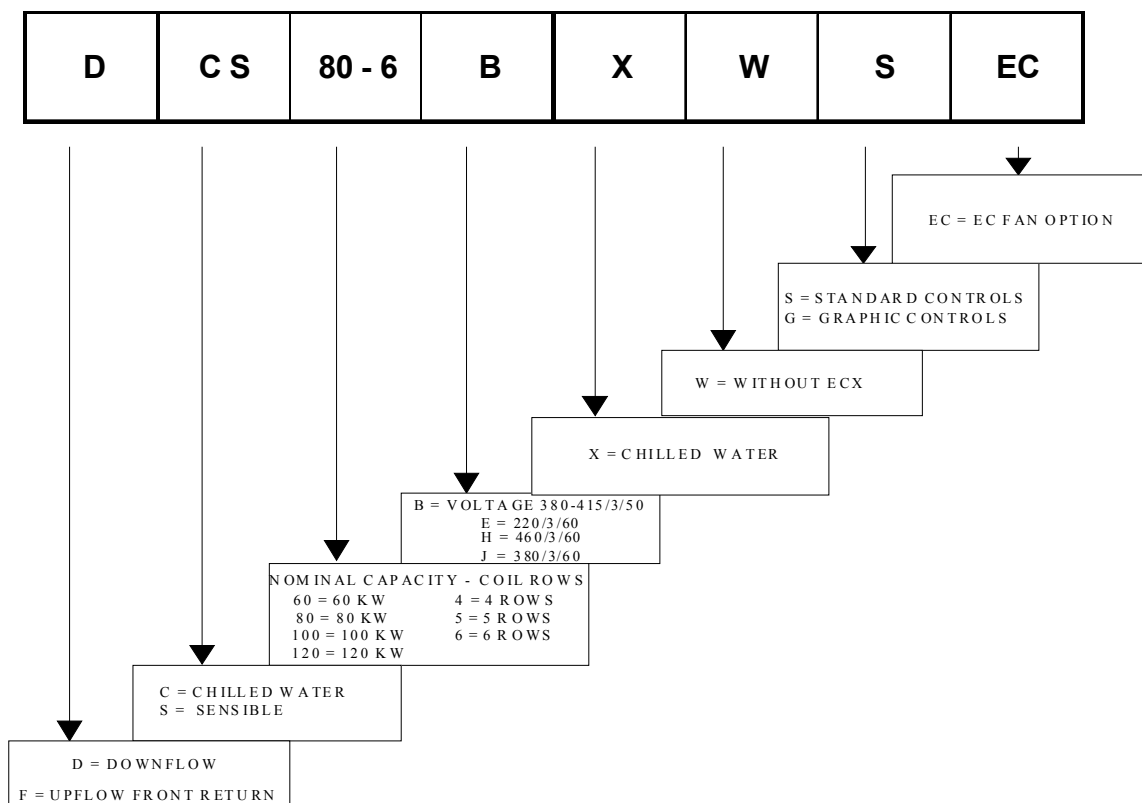
SMALL SYSTEMS

The Small Systems range comprises 2 module sizes providing nominal capacities of 6, 12 and 18 kW per module. The modules form the basis of the EDPAC Small Systems concept. Units are available in downflow with top return and upflow with front return. Cooling media include direct expansion using air and chilled water.

EQUIPMENT NOMENCLATURE

The DCS/FCS range of Close Control Chilled Water units comprises 4 sizes providing nominal capacities of 60, 80, 100 & 120 kW. Units are available in Upflow and Downflow configurations with top, bottom, front and rear return options. The range of units is ideal for very large data centre applications where Air Cooled or Water/Glycol Cooled Units would be impractical due to the size of the building close control cooling load.

As standard the DCS/FCS range of Close Control Chilled Water units are equipped with: G4 Filtration, 2 or 3 Port Control Valve, Twin Belt driven forward curved Centrifugal Fans and the latest Delta range of DIN rail mounted Microprocessor Controllers. The DCS/FCS range has an option also for backward curved EC plug fans which offer tremendous savings in fan power due to the fan/motor efficiency & the control options available in running the fans smartly in the modern data centre. Other options available include: Water Leak Detection, Autosequence/Autorotate, 3 Way Discharge Plenums, Graphic Display, Drain Trap, Smoke Detection, Fire Detection, Floorstand, loss of Chilled Water Flow Switch, Condensate Pumps & many more items. BMS interface cards are available for all of the most commonly-used protocols including but not limited to MODBUS, BACnet, LON, JCI METASYS & they all can be integrated into most BMS systems by RS 485 or over TCP/IP.



DIMENSIONS AND WEIGHTS

Dimensions (mm)

Model	60	80	100	120
Unit W x D x 1980H	1660 x 875	2000 x 875	2500 x 875	2900 x 875
DCS Return Air Acoustic Plenum	1660 x 875 x 600	2000 x 875 x 600	2500 x 875 x 600	2900 x 875 x 600
FCS Top Discharge Plenum	1660 x 875 x 600	2000 x 875 x 600	2500 x 875 x 600	2900 x 875 x 600

Weight (kgs)

Model	60	80	100	120
Unit – Dry	480	610	760	880
Unit – Operating	510	650	810	935
DCS Return Air Acoustic Plenum	50	60	70	80
FCS Top Discharge Plenum	60	70	80	90

STANDARD FEATURES

Cabinet

The cabinet frames shall be constructed of formed 2.0 mm Zintec steel sections. Paint finish is Epoxy Powder Coated with an "Orange Peel" textured finish. Interior panels to be manufactured from galvanised steel in all cases. Exterior panels are to be as cabinet except in 1.2 mm Zintec. Paint Colour to be RAL 9018. The front panels shall be fastened to the frame using quarter turn fasteners. Side panels shall be secured to the frame using chrome plated screws. All panels shall be flush fitting, sealed to the frame sections with closed cell foam and insulated with a non-shedding material, which shall be non-combustible, when tested in accordance with B.S. 476 Part 6 and 7. The units shall be fully accessible and serviceable from the front.

Cooling Coil

The cooling coils shall be multi-row (4, 5 or 6 row) constructed from 10mm or 12mm O/D copper tubes with aluminum fins. Large surface areas shall ensure high sensible heat ratios and low airside pressure drops, resulting in reduced fan power requirements and noise levels. All coils shall be tested to 25 bar during coil manufacture and shall be tested to 10 bar once unit piping is completed, prior to shipment.

2 or 3 Port Control Valve

Units shall be fitted with a 2 way or 3 way modulating valve having manual over-ride facility. For 3 port applications, a regulating device is provided on the bypass line for water balancing purposes.

Chilled Water Pipe Connections

F&R connections to be terminated in a male BSP thread.

Fans

Large, low speed, double inlet, double width fans with forward curved impellers and "sealed for life" self aligning bearings shall be used to minimise noise levels. Fans are belt driven. All units have twin fans on a common shaft. The fan/motor assembly is on a separate isolated deck.

Twin Belts

Twin grooved pulleys and twin belts giving a fixed speed are provided for each fan assembly.

Motors

The motor shall comply with IP55 TEFC insulated to Class F.

Filtration

The filters shall be 100mm thick disposable pleated panel filter rated G4 in accordance with EN779. They shall be fitted in the return air stream and be accessible from the front of a Upflow unit and the top of a Downflow unit.

Electrical Panel

The electrical panel shall be constructed and assembled in compliance with IEC standards with all components VDE approved. All sub circuits are protected by MCB's. The high and low voltage sections shall be segregated and all high voltage electrical components shall be touch safe.

Electric Heaters

Electric heaters shall have stainless steel sheathed elements with stainless steel finning, balanced over three phases and rated to operate at black heat. Control shall be in two stages. Protection is by a high temperature safety cut-out stat. The stat shall be a capillary type mounted in the airstream resettable from the control section of the electrical panel.

Humidification

The humidifier shall be of the electrode-boiler type. Features shall include selectable steam output and microprocessor control with alarms and diagnostic facilities. The humidifier control system shall allow the use of a wide range of mains water conditions namely: inlet mains water pressure of 1-10 bar, total hardness of 15-30 French degrees & water inlet electrical conductivity of 400-800 micro siemens. Unit shall optimise drain down frequency for maximum operational economy.

Microprocessor Controls

All units shall be fitted as standard with the latest Delta range of DIN rail mounted Microprocessor Controls. The Control System utilises a main Microprocessor Interface Board equipped with a set of terminals necessary to connect the Board to the controlled devices (e.g. valves, compressors, fans, reheats, sensors and humidifiers). All software is permanently stored in flash RAM and is therefore protected even in the event of a power failure. Unit software is uploaded to the Microprocessor using a RAM key or personal computer. On multi unit sites this quickens unit commissioning. The software can also be easily changed or upgraded on site by qualified service personnel.

The Microprocessor based Terminal Unit is complete with a 4 line x 20 character backlit LCD Display, keypad and LED Indicators allowing the user to easily set the main control parameters (set-points, differentials and alarm thresholds) and carry out the main working operations (on/off and displaying controlled variables).

Main features of controller are :

Status: The display shall indicate current temperature, current humidity, temperature & humidity set points, cooling status, heating status, humidification status & dehumidification status.

Redundancy Management & Master Control: The controls shall be capable of redundancy management & master control setup / " Handshake " of groups of up to 16 units without addition of any hardware.

Alarms: Controls shall be capable of storing last 100 alarms, identified by type, date stamped & indicating also the temperature & humidity conditions when the alarm occurred & also the setpoints of temperature & humidity when the alarm occurred. There are 36 alarms & all alarms can be either set as “ serious ” or “ non-serious”. A serious alarm shuts down the unit

Hours Thresholds: It shall be possible to to set run hours thresholds for major components to facilitate preventative maintenance.

Manual Procedure: With the unit powered off & the controls powered on it shall be possible to check all analogue & digital outputs & to run the devices.

Temperature & Humidity Zone setback: It shall be possible to create up to 4 periods in a 24 hour period with dedicated set points of temperature & humidity.

System Auto Restart: For start up after power failure, the unit shall automatically restart with an ability to stagger the starting of multiple units by setting a time delay of up to 999 seconds.

Security: The microprocessor shall have multiple levels of security (5 no. 4 digit passwords) to prevent unauthorised parameter adjustment.

Time Delays: It shall be possible to create or adjust if necessary the unit on time delay, unit off time delay, compressor interstage delay, compressor minimum run time,

compressor minimum stop time, heater interstage delay, winter start time delay, temperature alarm time delay, humidity alarm time delay, serious alarm time delay & non-serious alarm time delay.

Sensor Calibration: It shall be possible to recalibrate the temperature & humidity sensors in software.

Inputs / Outputs: It shall be possible to view the current status of all inputs & outputs while the unit is running.

Set & Hysterisis adjustment: It shall be possible to adjust the set & hysteresis % values of stepped outputs within the control.

BMS / BAS interfacing: It shall be possible with the addition of a simple communications card to communicate all Analog, Digital & Integer variables in the following protocols : LON FTT 10, BACnet over RS485 MSTP, BACnet over TCP/IP, SNMP over TCP/IP, MODBUS over RS485, Metasys & OPC Server.

Remote Display panel: It shall be possible to connect an additional shared LCD display which is wired back to the unit & this remote display shall have full control access to the unit from a distance of up to 100m.

Remote Temperature & Humidity sensing: It shall be possible to remotely locate the Temperature/Humidity sensor to better meet the sites cooling needs. The sensor can be located a distance of up to 30m from the unit.

OPTIONAL FEATURES

EC Plug Fans

Available instead of forward curved belt driven fans. The EC plug fan is a backward curved fan with integrated EC electrically commutated motor which is controlled directly from the microprocessor using a 0-10V output. Options on setup are :

Unit is set up with a discrete fan speed based on a fixed 0-10V output to the EC motor based on the design point of operation of the fan. This is the default setting on units shipped.

Unit set up to track the cooling control temperature band with set voltage limits whereby max voltage / fan air volume is at set point plus control band & min voltage / fan air volume at set point. Max air volume is typically design air volume & min air volume is around 60% for chilled water units. This is something that can be proven on site. Minimum value needs to ensure there are no hot spots due to lack of airflow & that there is no loss of sensible cooling capacity to latent cooling capacity at the cooling coil.

Unit set up to give a reduced fan air volume in dehumidification mode to conserve energy in dehumidification while quickly achieving the dehumidification effect at the cooling coil. This output voltage is again user selectable.

Unit is set up via an underfloor pressure transducer to give a fixed underfloor pressure all the time. Underfloor pressure setpoint is input through the unit user display.

3 Stage Reheat

Available in lieu of 2 stage by adding a electrical contactor & configuring the software to 3 stage.

Proportional Electric Reheat

Units shall be fitted with electric reheat controlled by a thyristor giving a fully proportional 0-10V output of the reheat capacity.

Hot Water Reheat

Units shall be fitted with a Low Pressure Hot Water (LPHW) heating coil in place of the standard electrical heating. Water flow through the coil is controlled by a 2 or 3 way modulating valve. Duties of these coils are nominally the same as standard electric heating, based on flow and return hot water temperatures of 82°C and 71°C respectively.

Cleanable Humidifier Cylinder

Humidifier cylinder is servicable whereas standard humidifier cylinder is disposable.

Low Conductivity Humidifier Cylinder

Disposable type used for water supply with low electrical conductivity.

Upsized Fan Motors

For applications where fan power requirements exceed the capacity of the standard motors, an upsized motor can be fitted. Standard unit ESP is 75 Pa. Units can normally be upgraded to 200 Pa or 400 Pa. In these instances please advise the factory on ESP Pa required.

Floor Stand

Floorstands are shipped flat-pack and need to be assembled on site. They are suitable for raised floor heights of 150mm to 600mm. The legs are notched at 50mm intervals for cutting on site. There is also a final adjustment on the foot of +/- 50mm. Scoops are also available as an option with the floorstand. Floorstands and scoops are manufactured from galvanised steel.

Damper & On/Off Actuator Kit

Addition of a damper & on/off actuator shipped loose which can be integrated into floorstand of downflow unit & to discharge of upflow unit. Actuator powered from unit electrical panel.

Air Discharge Plenum

For Upflow units which are to be installed in a freeblow situation. Plenum consists of an insulated sheet metal assembly with 3 discharge grilles. Grilles are double deflector type. Plenum colour will match unit colour. Plenums can also be manufactured as 1 way or 2 way discharge, please consult factory.

3 way discharge plenum complete with up to F9 rigid bag filters.

Plenum is mounted on top of unit. Plenum is 1000mm high with a 292mm long F9 rigid bag filter. Plenum has a diffusion section and 3 no. Air outlet grilles. Grilles on the front and 2 sides. It is also possible to have the F8/F9 discharge section on its own, plenum is 400mm high.

Rear Return

For upflow units. Required when unit is located in a service area outside the conditioned space. Fan deck is turned through 180 degrees. Return air is taken in the rear. Rear panel generally has a duct connection and filters are withdrawable from outside the unit.

Bottom return

For upflow units. Required if air is returned from a floor void. Bottom of unit is opened up and base components are mounted on rails. Filters cannot be fitted in unit and are shipped loose for installation beneath the unit on site.

Return Air Attenuator 500mm high.

Attenuator mounted on top of downflow unit. Attenuators have internal baffles and provide 8-10 db reduction on airborne noise.

F5/6/7 Panel Filters

Upgrade of standard G4 disposable panel filters to F5/6/7 disposable panel filters.

G2 Pre-filter with G4 Main Filter

100mm G4 disposable filter replaced with 50mm G2 disposable plus 50mm G4 disposable filter.

Washable Filters

Upgrade of standard disposable 100mm G4 disposable filters to washable 50mm G3 type plus 50mm G4 disposable filter.

Filter Clog

An additional pressure differential switch mounted in the unit to sense airside pressure drop across the filters. Once the pressure drop is exceeded a filter clog (filter change) alarm is generated.

Different Unit Colour

Units can be manufactured in a different colour to the standard RAL 9018. RAL number to be specified.

Double Skin Panels

All units. Inner perforated galvanized steel or solid painted or unpainted galvanized steel.

Fresh Air Connection

Units can be supplied with a fresh air inlet connection and disposable G4 filter. This will admit approximately 3-5% of the recirculated air volume.

Loss of Chilled Water Flow

Factory fitted flow switch which activates an alarm to indicate an interruption in Chilled Water supply to the unit.

Chilled Water Flow Temperature Measurement

Factory fitted NTC temperature sensor to output chilled water flow temperature on LCD display.

Flow Measurement

Factory fitted valve with fixed orifice measurement device FOMD. Can carry out functions of flow measurement, flow regulation and flow isolation.

Flow Isolation

Factory fitted quarter turn ball type isolation valve. Can be fitted in conjunction with flow measurement valve to isolate chilled water.

Test Ports

Binder type test points fitted on flow & return piping for temperature & pressure measurement with gauges.

Condensate Pump

Where, due to location, it is not possible to gravity drain units, a condensate pump can be fitted to collect any condensate and pump it to the nearest convenient drain point (pump duty is 6 l/min Vs 6 m head). A cheaper cold condensate pump is available for units without humidifiers.

Handshake - Autosequence / Autorotate

For interconnection of up to 16 units. Interconnection by means of a shielded twisted pair cable from interface board to interface board between units. This shall provide N+1 with one unit always in standby in case of duty unit failure. Standby unit shall be rotated over time. Changeover shall be set between 1- 168 hours (1 hour – 1 week). In case of high temperature alarm standby unit shall run & revert to standby once temperature is corrected. In the group of up to 16 unit, any number can be running & any number can be set in standby.

Smoke Detector

A smoke detector shall be provided & mounted in the return air path to interface with the unit controls and generate an alarm.

Fire Detector

A fire detector shall be provided & mounted in the return air path to interface with the unit controls and generate an alarm.

Fire Stat

A fire stat shall be provided & mounted in the return air path within the unit to interface with the unit controls and indicate an alarm.

Water Detection – Point Type

Consists of a water detection module mounted in unit & point sensor which can be placed in unit or under the floor. Multiple point sensors can be placed in series with each other. A cable type water warning is also available.

RS 485 Communications Card

Serial interface card for Microprocessor board. For BMS setup. Can communicate on Delta 2 own Protocol & Modbus without an external Gateway.

BACnet over RS 485

Serial interface card for Microprocessor board. For BMS setup. Runs on BACnet protocol over RS 485. Final setup by BMS system integrator.

BACnet over TCP/IP

Serial interface card for Microprocessor board. For BMS setup. Runs on BACnet protocol over TCP/IP. Final setup by BMS system integrator.

SNMP over TCP/IP

Serial interface card for Microprocessor board. For BMS setup. Runs on SNMP protocol over TCP/IP. Final setup by BMS system integrator.

LON Communication Card

Serial interface card for Microprocessor board. For BMS setup. Runs on LON FTT 10 protocol. Final setup by LON system integrator.

TREND Communication Card

Serial interface card for Microprocessor board. For BMS setup on TREND BMS. Final setup by TREND system integrator.

Graphic Display

An optional Graphical Terminal Unit is also available. This is a graphical display, LED Backlit with 132 x 64 pixel graphical resolution.

GENERAL ENGINEERING DETAILS

Model		60	80	100	120
Air Side Data					
Air Volume	m ³ / hr	15500	19000	25000	29000
External Static Pressure ESP	Pa	75	75	75	75
Standard FC Centrifugal Fan					
No. of Fans	No.	1	2	2	2
Fan Motor	kW	5.5	5.5	7.5	9.0
Optional EC Plug Fan					
No. of Fans	No.	2	2	3	3
Fan Diameter	mm	500	560	500	560
Fan Motor	kW	2.7	3.1	2.7	3.1
Fan Absorbed Power	kW	3.6	4.0	6.0	5.7
Filter Data					
Downflow Filter Size Code	-	1	2	3	4
Downflow Filter Quantity	No.	6	6	8	8
Upflow Filter Size Code	-	1	2	3	4
Upflow Filter Quantity	No.	4	4	4	8
Water Side Data					
Control Valve Size	mm	40	40	40	50
Control Valve Kv	-	25	25	25	40
Chilled Water F&R Pipe Size	mm	54	54	54	54
Cooling Coil Data					
Coil Face Area	m ²	1.52	1.89	2.42	2.84
Coil Rows	No.	4,5,6	4,5,6	4,5,6	4,5,6
Coil Drain Connection BSPF	inch	¾	¾	¾	¾
Noise Data					
Freefield SPL	dBA	59	59	58	61
Humidifier Data					
Capacity	kg/hr	8	8	8	8
Inlet Connection BSPM	inch	1	1	1	1
Drain Connection BSPF	inch	1	1	1	1
Water Feed Pressure	bar	1-10	1-10	1-10	1-10
Water Feed Conductivity	uS	400 – 800	400 – 800	400 – 800	400 – 800
Water Hardness Degrees F	-	15-30	15-30	15-30	15-30
Electric Reheat Data					
Capacity - 400V/3Ph/50Hz	kW	15.0	15.0	25.0	25.0
Capacity - 220V/3Ph/60Hz	kW	15.0	15.0	25.0	25.0
Capacity - 380V/3Ph/60Hz	kW	13.5	13.5	22.6	22.6
Capacity - 460V/3Ph/60Hz	kW	19.8	19.8	32.9	32.9
No. of Stages	No.	2	2	2	2

Notes:

- Indoor unit Freefield SPL dBA levels are measured at 3m.
- All filters are 100mm thick and have an efficiency rating of G4 in accordance with EU Standard EN779.
- Downflow Filter Size Code: 1 = 495mm x 545mm, 2 = 545mm x 622mm, 3 = 545mm x 595mm & 4 = 545mm x 695mm
- Upflow Filter Size Code: 1 = 445mm x 622mm, 2 = 545mm x 622mm, 3 = 545mm x 895mm & 4 = 545mm x 545mm.

4 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	49.6	45.3	41.0	36.7	32.2
Sensible Cooling	kW	49.4	44.9	40.9	36.4	31.9
Chilled Water Flow	l/s	2.1	1.9	1.7	1.6	1.4
Unit Pressure Drop	kPa	18	16	14	12	9
Air On: 24°C, 50% RH						
Total Cooling	kW	58.4	54.2	50.0	45.7	41.3
Sensible Cooling	kW	54.1	53.6	49.6	45.1	40.6
Chilled Water Flow	l/s	2.4	2.3	2.1	1.9	1.7
Unit Pressure Drop	kPa	21	21	18	16	14

5 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	56.9	52.3	47.6	42.8	38.0
Sensible Cooling	kW	54.4	51.9	47.4	42.4	37.9
Chilled Water Flow	l/s	2.4	2.2	2.0	1.8	1.6
Unit Pressure Drop	kPa	22	21	18	16	14
Air On: 24°C, 50% RH						
Total Cooling	kW	66.4	61.8	57.2	52.5	47.9
Sensible Cooling	kW	58.6	56.1	55.1	52.0	47.6
Chilled Water Flow	l/s	2.7	2.6	2.4	2.2	2.0
Unit Pressure Drop	kPa	28	25	22	21	19

6 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	62.3	57.4	52.5	47.5	42.5
Sensible Cooling	kW	57.5	55.4	52.4	47.4	42.4
Chilled Water Flow	l/s	2.6	2.4	2.2	2.0	1.8
Unit Pressure Drop	kPa	27	24	23	20	17
Air On: 24°C, 50% RH						
Total Cooling	kW	62.3	67.4	62.5	57.6	52.7
Sensible Cooling	kW	56.6	59.1	57.6	55.6	52.0
Chilled Water Flow	l/s	2.6	2.8	2.6	2.4	2.2
Unit Pressure Drop	kPa	27	32	27	24	23

Notes:

1. Cooling performances are gross. For nett capacities please deduct motor power as outlined on general engineering details page.
2. For cooling performance at other conditions, please refer to the product selection program.

DCS/FCS 80 - COOLING CAPACITIES

4 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	62.7	57.4	52.1	46.7	41.3
Sensible Cooling	kW	62.4	57.4	51.9	46.4	40.9
Chilled Water Flow	l/s	2.6	2.4	2.2	2.0	1.7
Unit Pressure Drop	kPa	26	23	22	19	16
Air On: 24°C, 50% RH						
Total Cooling	kW	73.4	68.3	63.0	57.8	52.4
Sensible Cooling	kW	68.1	67.5	62.6	57.1	51.6
Chilled Water Flow	l/s	3.1	2.8	2.6	2.4	2.2
Unit Pressure Drop	kPa	35	31	26	23	22

5 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	71.3	65.6	59.9	54.1	48.1
Sensible Cooling	kW	68.0	65.5	59.9	53.8	47.7
Chilled Water Flow	l/s	2.9	2.7	2.5	2.2	2.0
Unit Pressure Drop	kPa	35	31	26	25	21
Air On: 24°C, 50% RH						
Total Cooling	kW	68.8	77.3	71.5	65.8	60.1
Sensible Cooling	kW	66.9	69.9	68.1	65.0	59.5
Chilled Water Flow	l/s	2.8	3.3	2.9	2.7	2.5
Unit Pressure Drop	kPa	34	38	36	31	27

6 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	77.6	71.7	65.6	59.5	53.4
Sensible Cooling	kW	70.4	68.0	65.5	59.3	53.2
Chilled Water Flow	l/s	3.3	2.9	2.7	2.5	2.2
Unit Pressure Drop	kPa	41	38	33	28	26
Air On: 24°C, 50% RH						
Total Cooling	kW	82.4	83.8	77.9	71.9	65.8
Sensible Cooling	kW	71.8	73.6	70.6	68.1	65.0
Chilled Water Flow	l/s	3.5	3.5	3.3	3.1	2.7
Unit Pressure Drop	kPa	45	46	41	38	34

Notes:

1. Cooling performances are gross. For nett capacities please deduct motor power as outlined on general engineering details page.
2. For cooling performance at other conditions, please refer to the product selection program.

4 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	85.1	78.2	71.3	64.2	57.0
Sensible Cooling	kW	85.1	78.1	70.8	63.5	56.3
Chilled Water Flow	l/s	3.6	3.3	2.9	2.7	2.4
Unit Pressure Drop	kPa	49	43	39	34	28
Air On: 24°C, 50% RH						
Total Cooling	kW	99.3	92.4	85.5	78.6	71.6
Sensible Cooling	kW	89.4	87.2	84.8	77.5	71.1
Chilled Water Flow	l/s	4.1	3.9	3.6	3.3	2.9
Unit Pressure Drop	kPa	63	56	49	43	39

5 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	96.1	88.5	81.0	73.4	65.7
Sensible Cooling	kW	89.4	88.5	80.5	73.2	65.1
Chilled Water Flow	l/s	4.0	3.7	3.4	3.1	2.7
Unit Pressure Drop	kPa	64	56	48	42	37
Air On: 24°C, 50% RH						
Total Cooling	kW	101.1	103.8	96.4	88.8	81.3
Sensible Cooling	kW	101.1	103.8	89.6	88.0	80.7
Chilled Water Flow	l/s	4.2	4.3	4.0	3.7	3.4
Unit Pressure Drop	kPa	69	73	64	56	49

6 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	103.9	96.1	88.3	80.2	72.2
Sensible Cooling	kW	103.9	91.1	88.3	79.7	71.6
Chilled Water Flow	l/s	4.3	4.0	3.7	3.4	3.1
Unit Pressure Drop	kPa	80	71	62	54	47
Air On: 24°C, 50% RH						
Total Cooling	kW	118.3	111.9	104.2	96.4	88.5
Sensible Cooling	kW	118.3	111.9	104.2	89.6	88.0
Chilled Water Flow	l/s	4.9	4.6	4.3	4.0	3.7
Unit Pressure Drop	kPa	98	91	80	71	62

Notes:

1. Cooling performances are gross. For nett capacities please deduct motor power as outlined on general engineering details page.
2. For cooling performance at other conditions, please refer to the product selection program.

DCS/FCS 120 - COOLING CAPACITIES

4 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	101.5	93.4	85.3	77.1	68.6
Sensible Cooling	kW	101.5	93.4	84.9	76.5	68.1
Chilled Water Flow	l/s	4.2	3.9	3.6	3.3	2.8
Unit Pressure Drop	kPa	48	43	38	34	31
Air On: 24°C, 50% RH						
Total Cooling	kW	118.2	110.1	101.9	93.9	85.7
Sensible Cooling	kW	105.8	101.1	101.1	92.7	84.3
Chilled Water Flow	l/s	4.9	4.6	4.2	3.9	3.6
Unit Pressure Drop	kPa	59	54	48	43	38

5 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	113.8	105.1	96.2	87.4	78.4
Sensible Cooling	kW	104.7	101.8	96.2	86.8	78.4
Chilled Water Flow	l/s	4.7	4.4	4.0	3.7	3.3
Unit Pressure Drop	kPa	64	57	51	44	39
Air On: 24°C, 50% RH						
Total Cooling	kW	125.8	122.8	114.1	105.5	96.5
Sensible Cooling	kW	109.6	107.7	103.9	102.1	95.5
Chilled Water Flow	l/s	5.3	5.2	4.7	4.4	4.0
Unit Pressure Drop	kPa	74	71	64	57	51

6 ROW COIL

Chilled Water [°C]		6/12	7/13	8/14	9/15	10/16
Air On: 22°C, 50% RH						
Total Cooling	kW	122.6	113.5	104.3	95.0	85.6
Sensible Cooling	kW	110.4	105.6	101.8	95.0	84.9
Chilled Water Flow	l/s	5.2	4.7	4.3	4.0	3.6
Unit Pressure Drop	kPa	82	74	66	58	52
Air On: 24°C, 50% RH						
Total Cooling	kW	145.2	115.9	122.8	113.7	104.6
Sensible Cooling	kW	118.1	105.8	110.5	106.8	103.9
Chilled Water Flow	l/s	6.1	4.8	5.2	4.7	4.4
Unit Pressure Drop	kPa	105	76	81	74	66

Notes:

1. Cooling performances are gross. For nett capacities please deduct motor power as outlined on general engineering details page.
2. For cooling performance at other conditions, please refer to the product selection program.

ELECTRICAL DETAILS

400V/3PH/50Hz

Model	60	80	100	120
Controls FLA	1.0	1.0	1.0	1.0
Fans FLA	11.0	11.0	14.8	18.0
Reheat FLA	21.7	21.7	35.9	35.9
Humidifier FLA	8.4	8.4	8.4	8.4
Max Unit FLA - Cooling only	12.0	12.0	15.8	19
Max Unit FLA - Cooling & Dehumidification	33.7	33.7	51.7	54.9
Max Unit FLA - Heating & Humidification	42.1	42.1	60.1	63.3

220V/3PH/60Hz

Model	60	80	100	120
Controls FLA	1.0	1.0	1.0	1.0
Fans FLA	20.0	20.0	26.9	32.7
Reheat FLA	39.5	39.5	65.3	65.3
Humidifier FLA	15.3	15.3	15.3	15.3
Max Unit FLA - Cooling only	21.0	21.0	27.9	33.7
Max Unit FLA - Cooling & Dehumidification	60.5	60.5	93.2	99.0
Max Unit FLA - Heating & Humidification	75.8	75.8	108.5	114.3

380V/3PH/60Hz

Model	60	80	100	120
Controls FLA	1.0	1.0	1.0	1.0
Fans FLA	11.6	11.6	15.5	18.9
Reheat FLA	20.6	20.6	34.3	34.3
Humidifier FLA	8.8	8.8	8.8	8.8
Max Unit FLA - Cooling only	12.6	12.6	16.5	19.9
Max Unit FLA - Cooling & Dehumidification	33.2	33.2	50.8	54.2
Max Unit FLA - Heating & Humidification	42.0	42.0	59.6	63.0

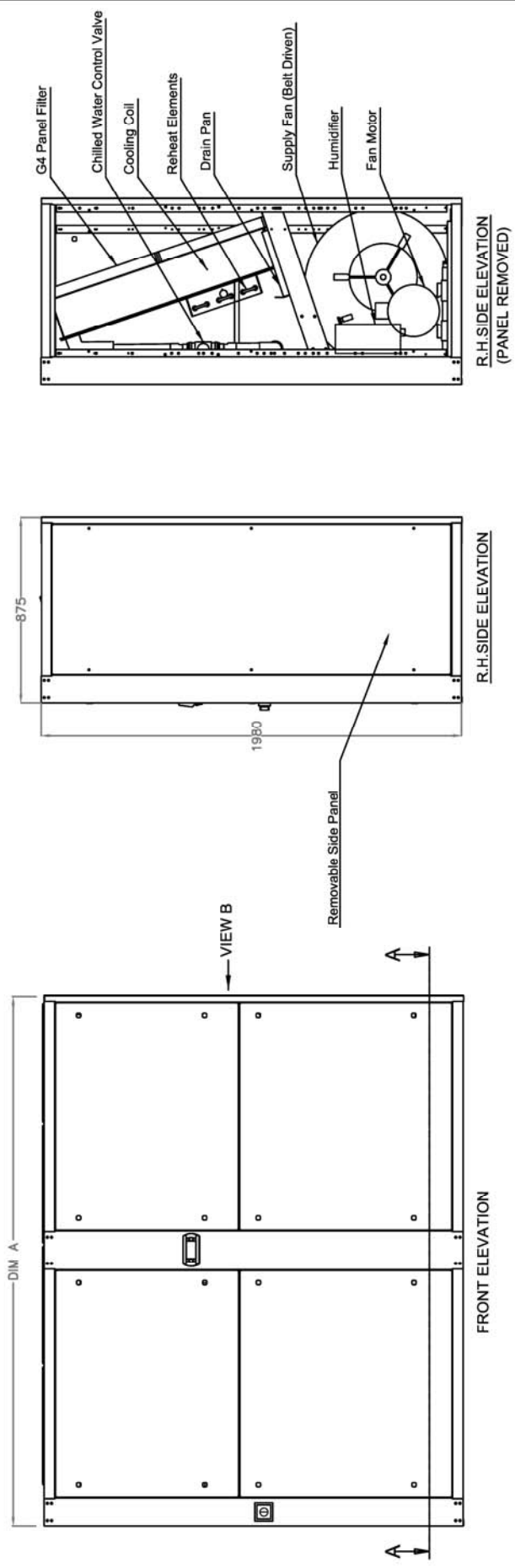
460V/3PH/60Hz

Model	60	80	100	120
Controls FLA	1.0	1.0	1.0	1.0
Fans FLA	9.6	9.6	12.1	15.7
Reheat FLA	24.9	24.9	41.3	41.3
Humidifier FLA	7.3	7.3	7.3	7.3
Max Unit FLA - Cooling only	10.6	10.6	13.1	16.7
Max Unit FLA - Cooling & Dehumidification	35.5	35.5	54.4	58.0
Max Unit FLA - Heating & Humidification	42.8	42.8	61.7	55.3

Notes:

1. FLA = Full Load Amps.
2. Unit maximum FLA is the total of the components, which operate during maximum electrical load conditions.
3. Max FLA of cooling only unit : FLA = Controls + Fans.
4. Max FLA of unit with reheat in dehumidification : FLA = Controls + Fans + Reheat.
5. Max FLA of unit with heating & humidifiers : FLA = Controls + Fans + Reheat + Humidifier.

GENERIC DIMENSIONAL DRAWING – DOWNFLOW UNIT



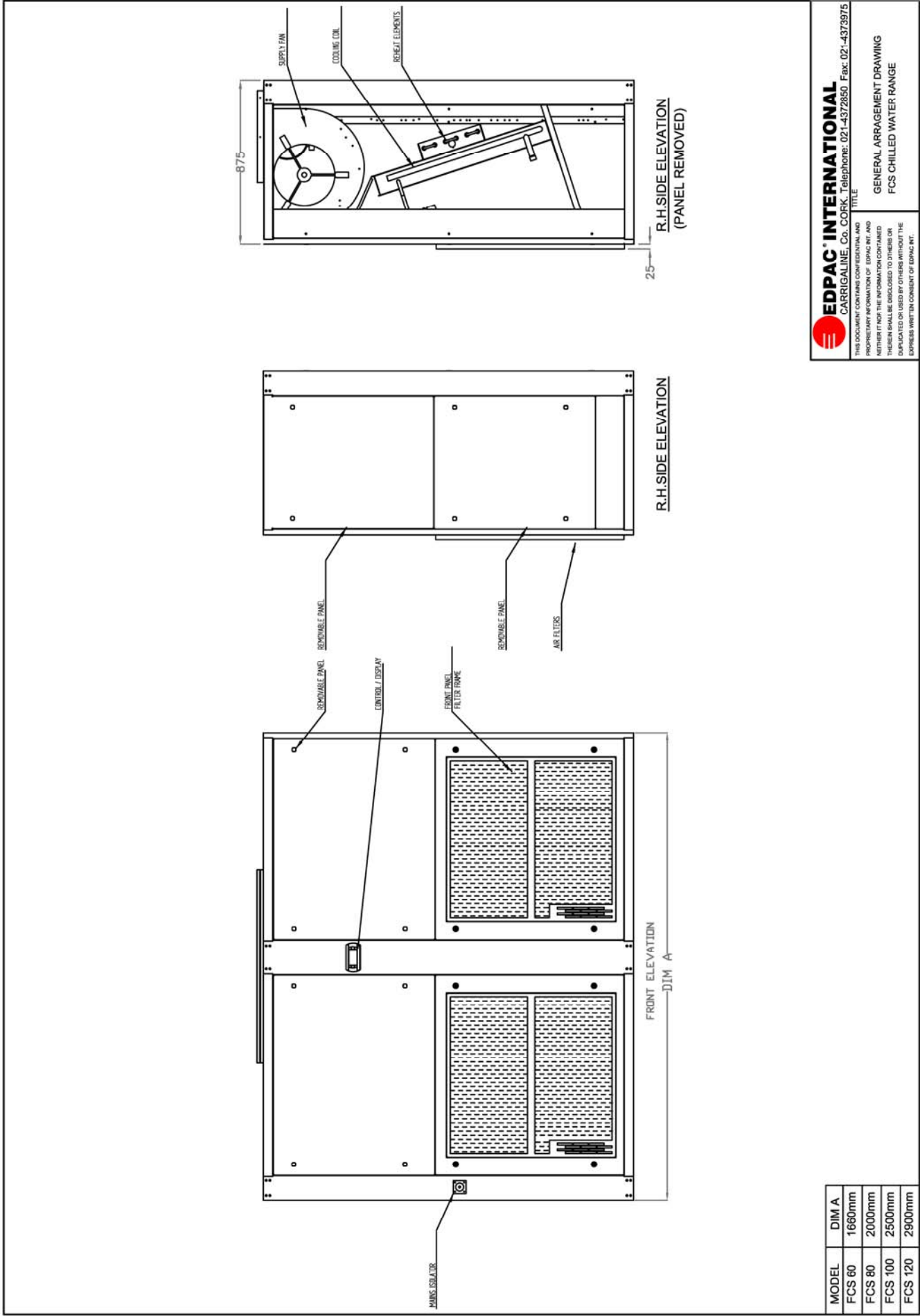
MODEL	DIM A
DCS 60	1860mm
DCS 80	2000mm
DCS 100	2500mm
DCS 120	2900mm

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TITLE
GENERAL ARRANGEMENT DRAWING
DCS CHILLED WATER RANGE

GENERIC DIMENSIONAL DRAWING – UPFLOW UNIT



MODEL	DIM A
FCS 60	1660mm
FCS 80	2000mm
FCS 100	2500mm
FCS 120	2900mm

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TITLE
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