

## 1.0- System Description

Tyfoxit Low Temperature Chiller consists of a semi-hermetic compressor, water-cooled condenser, liquid receiver complete with its own evaporator refrigeration circuit, Tyfoxit circulation pump and a custom-made starter and control panel fitted on a common skid for a fully automated operation.

High pressure R 404A (HFC) refrigerant gas is supplied to condenser unit whereby the cooling water of the condenser acts as a condensing media within the heat exchanger to condense the refrigerant from gas to liquid state.

High-pressure liquid refrigerant is later circulated via a liquid receiver to the expansion device. High-pressure liquid refrigerant turns into low-pressure cold gas within the evaporator heat exchanger and the cold gas returns back to the compressor suction to complete the refrigeration cycle.

Tyfoxit return solution from the system is received by the pump suction through a strainer and the pump pushes warmer Tyfoxit solution through the heat exchanger to complete the hydraulic circuit. Tyfoxit enters the evaporator from the top and it leaves from the bottom and the cold Tyfoxit supplied by the heat exchanger is returned back to the system.

Tyfoxit Low Temperature Chiller is specifically designed to provide infinitive capacity control via the combination of 50% capacity control valve together with a hot gas by-pass system. The control over this function is fully automated to ensure that low load conditions are satisfied.

A remote control panel provides an automatic start signal either via a digital buffer tank temperature controller or alternatively a manual override switch initiates the chiller cooling side. The rest of the cooling operation and internal controls are provided via internal Tyfoxit Low Temperature Chiller flow and return temperature controllers.

All the necessary internal safety switches and functions are provided in accordance with BS 4434 for a safe and reliable operation.

The unit is supplied fully charged with oil and refrigerant. It is ready to start as long as the Tyfoxit pipework connections are completed and the system charged with Tyfoxit fluid. An internal pump contact protects the chiller against pump failure and no flow condition. Unless sufficient rate of Tyfoxit flow is provided the chiller controller holds back the refrigeration circuit as an anti-freeze protection.

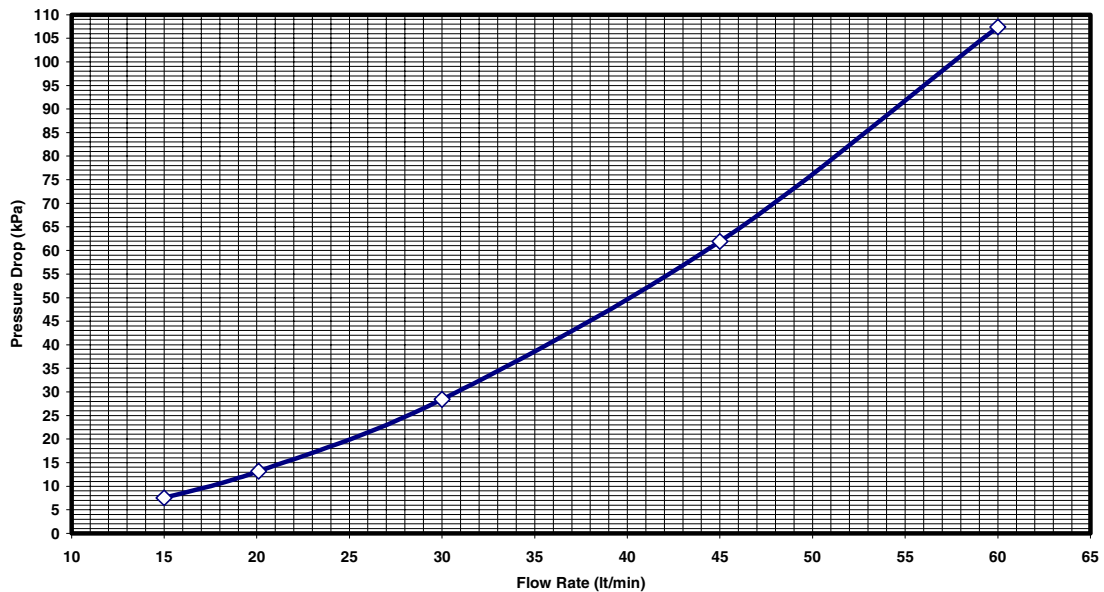
## 2.0- System Components

Semi-hermetic Compressor ; 4 cylinder semi-hermetic reciprocating type fully unloaded start compressor complete with 50% capacity control. Based on the operating condition a head cooling system is also provided to cool the cylinder heads in line with the manufacturer recommendation.

Water Cooled Condenser; A stainless steel plate heat exchanger type condenser complete with head pressure controlled water flow valve set is included as part of the package. A head pressure control valve is activated by the refrigeration circuit delivery pressure in order to protect excessive low head pressure operations which would cause the expansion valve to hunt and effectively lose the control over the Tyfoxit leaving temperature.

The relevant flow and pressure drop chart is as follows;

CONDENSER FLOW CONDITIONS

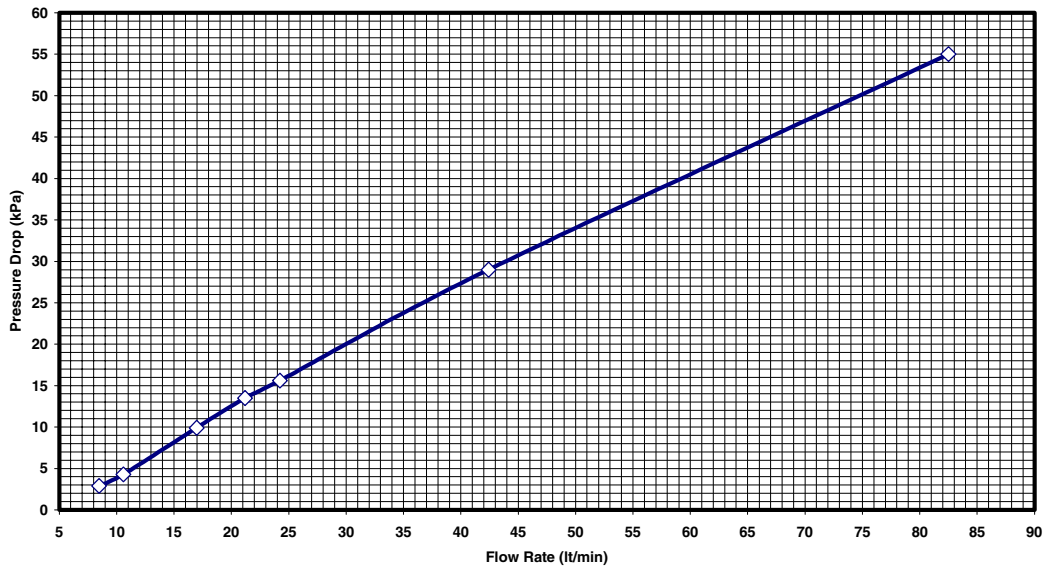


Liquid Receiver; 12 lt. capacity liquid receiver complete with isolating valve and safety relief devices is also incorporated as part of the package.

Circulation Pump; A stainless steel multi-stage centrifugal complete with associated strainer, flow switch, temperature probes, flow regulator and isolating valves are incorporated as part the skid mounted package and the flow characteristics are as follows.

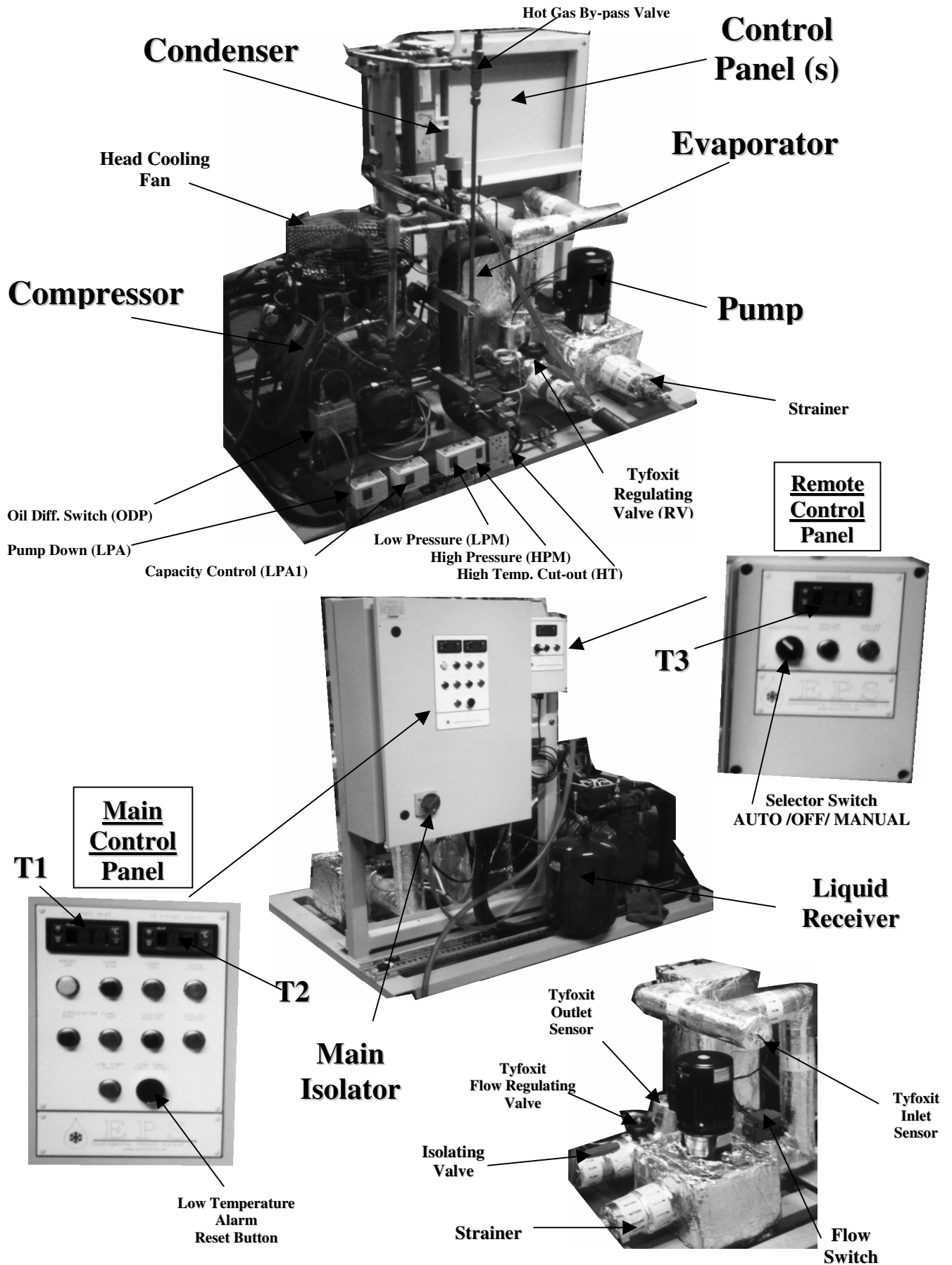
Evaporator; A stainless steel plate heat exchanger evaporator is incorporated as part of the package and the relevant design flow rate and pressure drop curve is as follows.

EVAPORATOR FLOW CONDITIONS (TYFOXIT F-50 @ -40C)



Main Control Panel; houses all the necessary starter & control units for both pump and refrigeration unit. Flow and return digital operator adjustable temperature controllers on the face of the panel are provided for the system control.

Remote Control Panel; Complete with a digital buffer tank temperature controller and 3-position selector switch.



### 3.0- Operational Data

Under normal operational conditions the following limits can be checked to ensure that system operating correctly.

#### ***Design Specifications;***

Model	:	<b>WCU/5/40</b>
Nominal Capacity	:	5.0 kW (Cooling)
Refrigerant	:	R404a (HFC)

#### ***Condenser;***

Cooling Water Inlet	:	27 °C
Cooling Water Inlet	:	35 °C
Flow Rate	:	0.34 lt./s

#### ***Evaporator;***

Flow Inlet	:	-37 °C
Flow Outlet	:	-42 °C
Flow Rate	:	0.34 lt./s (20.4 lt./min)
Evaporation	:	-45 °C
Solution	:	Tyfoxit F-50

#### ***Dimensional Details;***

Length (mm)	:	1000
Width (mm)	:	1350
Height (mm)	:	1200
Weight	:	300 kg (Shipping)
		325 kg (Operating)

***Electrical Details;***

Supply	:	400 V/3Ph/50Hz
Running Current	:	22 Amps (Cooling Mode)
Refrigerant Type	:	R404a
Refrigerant Charge	:	1.5 kg

***TYFOXIT CIRCULATION PUMP;***

Flow Rate (kg/s)	:	0.35
Head (kPa)	:	200
Supply	:	400/3/50
Electric Motor (kW)	:	0.37
FLA (Amps)	:	0.96