



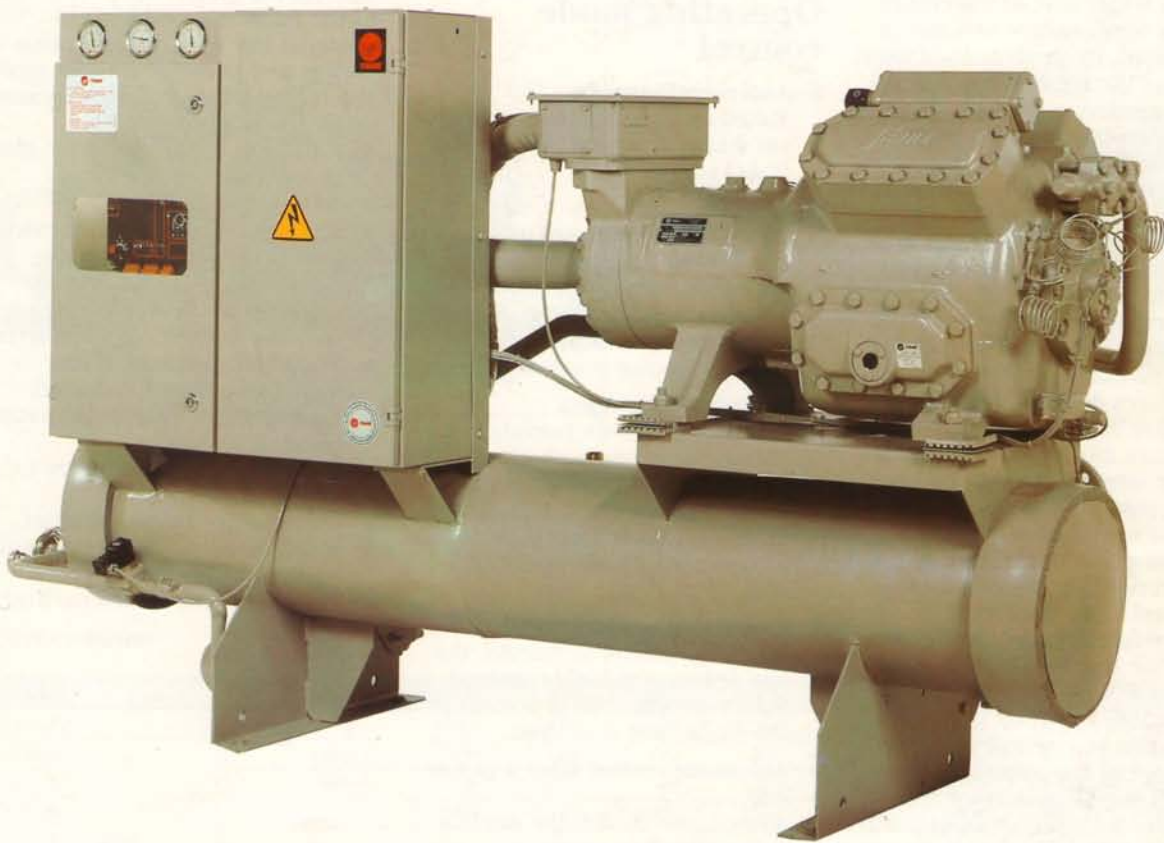
TRANE™

CGWD CCUD

Liquid chillers, water cooled
or remote air cooled.

Single circuit.

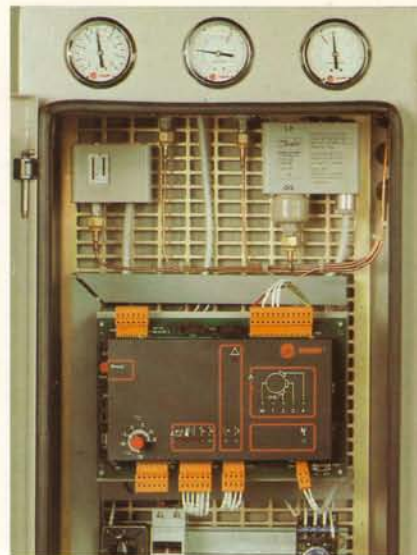
- Fitted with a microprocessor-based leaving chilled water temperature controller.
- Extensive remote control and communication capabilities.
- Nominal cooling capacities 55 kW to 294 kW (50 Hz), 9 unit sizes.
- All water cooled models factory run tested.
- Model CGWD with built-in, water cooled condensers, model CCUD for use with remote air cooled condenser.
- Designed and manufactured in accordance with the Trane Quality Management System approved to BS 5750, Part 1.



B47 CA 002 E

Reciprocating liquid chillers, water cooled or remote air cooled.
Series CGWD and CCUD 55 kW to 294 kW (50 Hz).

The new Trane CGWD reciprocating liquid chillers make use of proven components which have contributed to establish the reputation of superior reliability and performance of the Trane reciprocating chillers. The Trane water chillers type CGWD and compressor chillers type CCUD are equipped with the latest microprocessor control technology. Microprocessor chiller control means smooth, accurate and logical chiller control. That translates into even greater reliability and chiller performance. All unit sizes are exceptionally compact and fully accessible for service and maintenance. The liquid chillers are available with built-in water cooled condensers or without condenser for use with a remotely installed air cooled condenser. All water cooled chillers are fully factory run-tested before shipment.



Control module specifications

Microprocessor based chilled water control

The RCM controls from the leaving or supply water side of the chiller. With this temperature as a component of input, its programmed logic establishes the appropriate control response needed to produce a stable and accurate leaving water temperature condition. The PID (proportional plus integral plus derivative) control action works as follows: Proportional control produces a degree of compressor loading or unloading that is proportional to the difference between the leaving water temperature and the set point temperature.

This is where integral control action takes over; so long as the temperature difference persists, the controller integrates the error over time and continues to load or unload the compressor, as necessary, in an effort to return the temperature to the set point. Integral control looks backwards in time, therefore it cannot anticipate the need for future control action. The derivative function anticipates future control action by taking into consideration the rate of temperature change or the slope of the change. If the slope is steep, the compressor is loaded or unloaded at a fast rate. If the slope is shallow, the loading or unloading rate is reduced.

PID control produces accurate, responsive control action, eliminating steady state error from the chiller leaving water temperature.

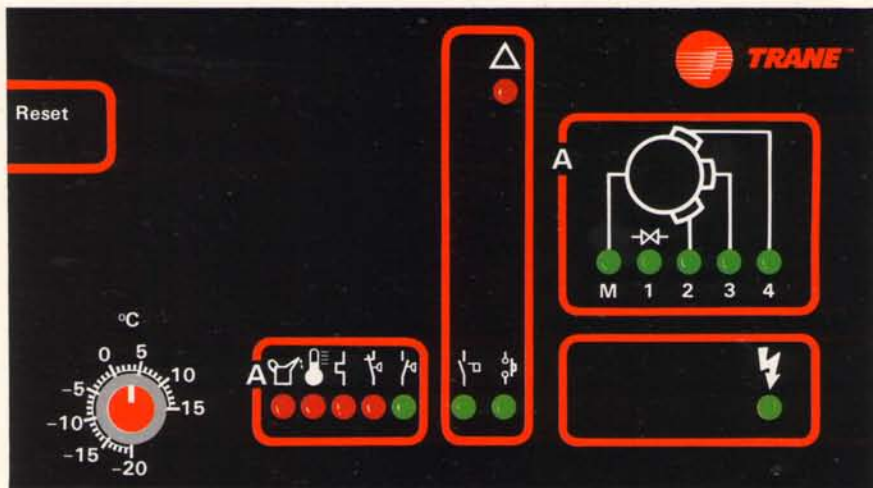
Operating mode control

- **Anti-recycle timing**
Based on time between compressor starts, this provides operational stability.
- **Load limiting**
After starting the chiller the last compressor step is loaded only when the leaving chilled water temperature falls below the preset point, thus preventing nuisance motor overload trips.
- **Periodic pump-down**
During shut-down periods, evaporator pressure is checked hourly. If the pressure rises above a safety limit, a pump-down cycle is initiated. Periodic pump-down avoids liquid slugging at start-up.
- **Low pressure start logic**
When the chiller is started, the low pressure signal is ignored for 3 minutes until pressures in the chiller are stabilized.
- **Automatic restart after a power loss**
After a power loss, the module automatically restarts the chiller, provided no fault condition is detected.

System protection

All the safety parameters are checked before the chiller starts and during chiller operation. If one of the following problems is detected the RCM module stops the chiller and provides trouble shooting information via LEDs located on its front cover.

- Chiller water set point too close to low temperature cutout setting.
- Malfunction of the RCM module.
- Low leaving chilled water temperature. This prevents freezing while avoiding the nuisance of low temperature trips.
- Water temperature sensor is defective or short circuited.
- Loss of water flow in the evaporator.
- Low evaporating pressure below set point.
- Oil pressure below set point.
- Motor winding temperature too high.
- Motor current drawn too high.



Communication

The RCM module offers several possibilities of communication. These different systems of communication considerably simplify the fault diagnostic and provide status information.

Operator interface

The RCM module has a display board with LEDs providing the following information:

- Compressor loading status.
- Evaporator water pump on.
- Control power supply on.
- Safeties satisfied (oil pressure, motor temperature, condensing pressure...).

Should a safety device trip out, the corresponding fault indicating LED and the general fault LED are energized.

When the defect is repaired the reset button must be depressed to enable the chiller to restart. The leaving chilled water temperature set point can be adjusted on the face of the RCM module.

Remote control and communication interface

The RCM module is equipped with terminal strips for the connection of the following input:

- Remote On/Off control by means of a potential-free contact.
- Remote chilled water reset through an analogical input (0 to 10 volts).

Optional relay card can be connected to the RCM module providing potential free contacts for remote status and failure indication:

- Chiller ready for start.
- Machine in operation.
- Oil pressure trip-out.
- Freeze protection trip-out.
- Motor winding temperature trip-out.
- Condensing pressure trip-out.
- Motor overload trip-out.

Remote control through a serial link

The RCM module is fitted with a serial communication connection which allows the chiller to be integrated in a Building Management or Automation System. All information required to control the chiller from a remote location is converted into binary signals and

transmitted through a serial communication link.

Up to 16 chillers can be connected to the same link.

The RCM module uses a TTY type serial communication link. This link is compatible with almost all B.A. Systems available on the market. Its sensibility to interference is very low, transmission speed reaches 4800 bauds. The maximum length of the link is 1500 meters. The RCM is a "slave system" controlled from the higher level Building Automation System which can send the following commands:

- Change of the chilled water set point.
- Start or stop the chiller.

The B.A. System can also extract from the RCM such information as:

- Chilled water set point.
- Freeze protection set point.
- Leaving chilled water temperature.
- Number of loaded capacity steps.
- Hot gas bypass in operation (chillers equipped with hot gas bypass only).

Should the unit trip out on a safety device:

- Type of fault.

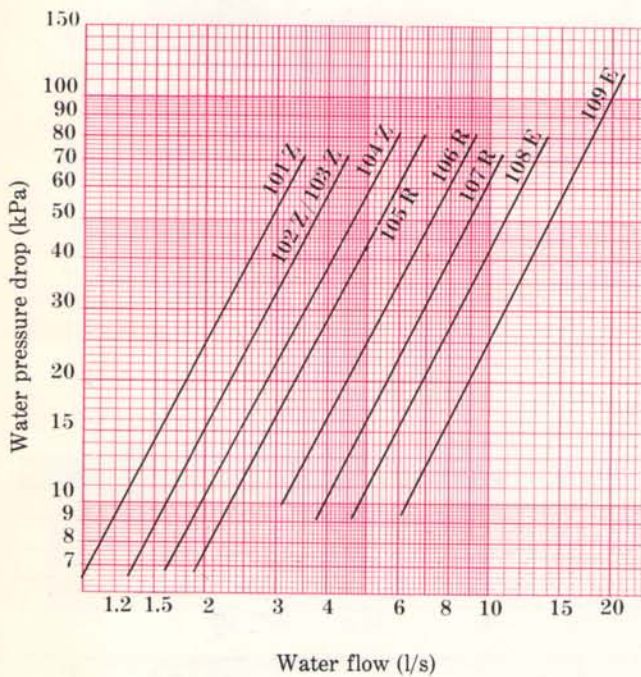
The information obtained through the serial link can be displayed on a computer control monitor.

The local Trane sales office will provide the protocol specification upon request.

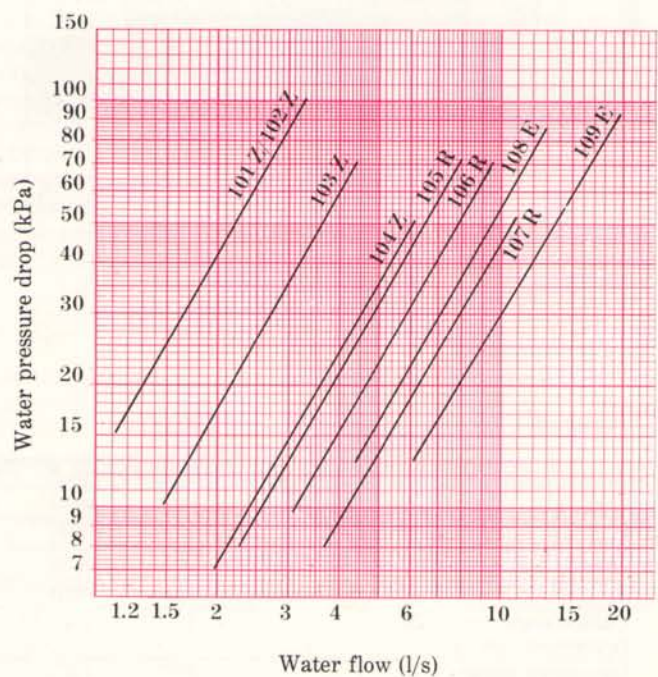
Cooling capacities and power input (50 Hz)

Model	Evap. leaving water temp. (°C)	Condenser leaving water temperature (°C)							
		30		35		40		45	
		Cooling (kW)	Input (kW)	Cooling (kW)	Input (kW)	Cooling (kW)	Input (kW)	Cooling (kW)	Input (kW)
101 Z	5	52.1	11.9	49.4	12.6	46.7	13.5	43.9	14.3
	7	55.7	12.1	52.7	13.0	49.9	13.9	46.9	14.8
	9	59.3	12.3	56.2	13.3	53.3	14.2	50.2	15.2
102 Z	5	65.1	14.7	62.0	15.8	58.6	16.9	54.8	18.0
	7	69.4	15.0	66.1	16.1	62.5	17.2	58.5	18.5
	9	73.9	15.2	70.2	16.5	66.4	17.7	62.3	18.9
103 Z	5	75.2	17.5	71.7	18.7	67.9	19.8	63.9	21.0
	7	80.1	17.8	76.4	19.1	72.3	20.4	68.2	21.6
	9	85.1	18.2	81.2	19.5	77.0	20.8	72.6	22.1
104 Z	5	94.7	22.0	89.4	23.3	84.6	24.7	79.5	26.2
	7	101.2	22.5	96.0	23.8	90.5	25.4	85.2	26.9
	9	108.1	22.7	102.6	24.3	97.0	26.0	91.3	27.6
105 R	5	119.7	28.3	113.7	30.3	107.5	32.2	101.3	34.0
	7	127.5	28.9	121.4	31.0	115.1	33.0	108.5	35.0
	9	135.5	29.4	129.3	31.7	122.9	33.8	116.2	35.9
106 R	5	151.9	33.9	144.5	36.4	136.8	38.7	129.0	40.9
	7	161.5	34.4	153.9	37.0	146.0	39.5	137.8	41.8
	9	171.3	34.9	163.6	37.6	155.4	40.3	147.0	42.7
107 R	5	182.3	41.4	174.0	44.5	165.5	47.4	156.8	50.3
	7	193.1	41.9	184.5	45.2	175.6	48.3	166.5	51.4
	9	204.1	42.4	195.1	45.9	185.9	49.2	176.4	52.4
108 E	5	216.9	44.7	205.7	48.1	194.5	51.3	183.3	54.4
	7	230.9	45.4	219.2	49.0	207.6	52.4	195.9	55.8
	9	245.6	46.0	233.2	49.9	221.0	53.5	208.0	57.8
109 E	5	282.1	58.5	268.9	63.1	255.2	67.4	241.2	71.5
	7	299.7	59.3	286.1	64.2	272.0	68.8	257.6	73.2
	9	317.6	60.0	303.9	65.3	289.5	70.2	274.5	74.9

Condenser water side pressure drop



Evaporator water side pressure drop



Electrical and general data

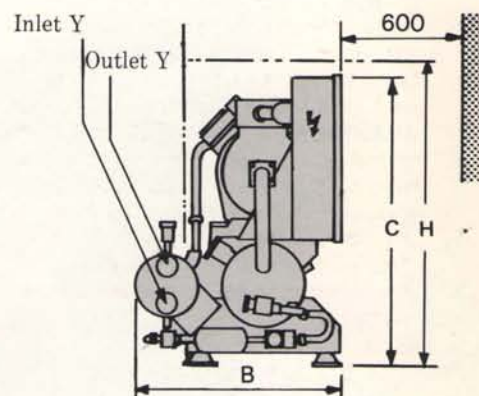
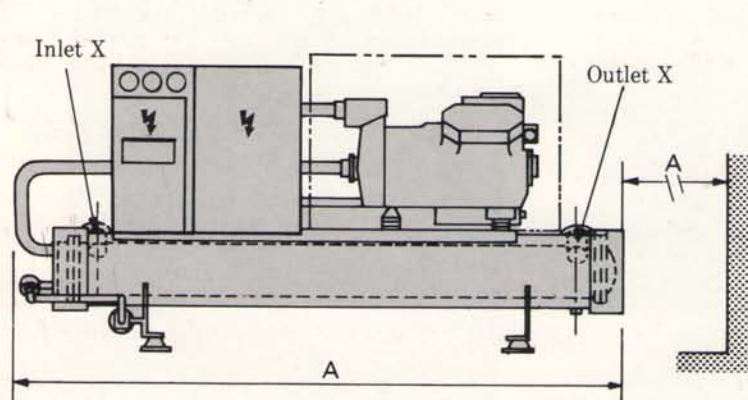
Model	CGWD	101 Z	102 Z	103 Z	104 Z	105 R	106 R	107 R	108 E	109 E
Nominal cooling capacity (1)	kW	54.5	68.2	78.7	99.2	125.1	158.5	189.6	226.2	294.3
Power input (1)	kW	12.4	15.4	18.3	22.9	29.7	35.5	43.3	46.8	61.3
No of compressors/circuits		1	1	1	1	1	1	1	1	1
Capacity steps	%	50	50	50	67-(33)	50	67-(33)	67-(33)	67-50-33	75-50-37
Full load amps (2)	A	32	37	45	56	81	85	106	113	154
Starting amps (3)	A	91	107	133	162	252	304	358	420	634
Evaporator water content	litres	30	30	38	58	51	103	103	88	163
Condenser water content	litres	7	10	10	11	14	18	21	25	45
R22 operating charge	kg	13	14	15	18	23	25	33	36	45
Unit operating weight	kg	550	565	600	740	900	1180	1190	1530	1980

(1) At +7°C chilled water leaving and 32°C condenser water leaving temperature. Standard size heat exchangers.

(2) At 415/3/50, 5 bar suction pressure, 25 bar discharge pressure.

(3) At part-winding start.

(4) All capacity and weight data apply to the series CGWD units (with built-in water cooled condenser). For series CCUD units (without condenser, for use with remote air cooled condenser) refer to your Trane Sales Office for information.



Dimensions

Model	CGWD	101 Z	102 Z	103 Z	104 Z	105 R	106 R	107 R	108 E	109 E	
Length	A	(mm)	1870	1870	2090	2160	2160	2230	2400	2420	2850
Width	B	(mm)	710	710	710	790	830	1010	1010	1010	1160
Height	C	(mm)	1170	1170	1170	1220	1210	1260	1260	1380	1480
Height	H	(mm)	1330	1330	1330	1330	1380	1400	1400	1600	1600
Chilled water connection size (1)	X		1½"	1½"	2"	2½"	2½"	3"	3"	3"	4"
Condenser water connection size (2)	Y		1½"	1½"	1½"	2"	2"	3"	3"	3"	4"

(1) Threaded connections ISO/R7 on sizes 101 to 103, flanged connections on sizes 104 to 109.

(2) Connections female pipe thread ISO/R7 on all sizes except 109 E, which has flanged connections.

(3) Minimum clearance on all four sides 600 mm, recommended clearance for tube removal on the right or left hand side of the unit : Dimensions A.

(4) Location of water connections depends on model and size. Refer to certified drawings.

(5) Drawings and dimensions approximate. Certified drawings on request.

Mechanical specifications

Single circuit liquid chiller unit, factory assembled and wired, consisting of :

Compressor

Semi-hermetic reciprocating compressor with capacity control and reduced load starting. Positive displacement oil pump, oil filter, sight glass and crankcase heater. Suction gas cooled motor protected by winding temperature sensors and external overload relay.

Water cooled condenser (except series CCUD)

Shell-and-tube design consisting of steel shell welded to heavy tube sheets. Seamless integrally finned copper tubes mechanically expanded into grooved tube sheets. Built-in liquid subcooler. Removable heads of closed grain cast iron. Water connections female pipe thread ISO R7. Size 109 with flanged connections. Safety relief valve. Maximum operating pressure refrigerant side 2.5 MPa, water side 1.4 MPa.

Evaporator

Shell-and-tube design with refrigerant inside the tubes and water circulating in the shell ; steel shell welded to heavy steel tube sheets. Seamless copper tubes mechanically expanded into grooved tube sheets. Refrigerant heads of high strength cast steel bolted to the tube sheets. Self-energizing type gaskets requiring low bolt torque. Water connections threaded ISO R7 on sizes 101 to 103, flanged on sizes 104 to 109. Thermal insulation of evaporator of flexible closed cell polyvinylchloride. Maximum operating pressure refrigerant side 1.4 MPa, water side 1.4 MPa.

Control and starter panel

Panel with separate compartments for motor starter and controls.

Starter panel section includes.

- Part-winding motor contactors
- Overload relay
- Terminal strips

Control panel section including Trane RCM microprocessor-based control and communication module providing the following functions :

- Evaporator leaving water PID temperature control
- Control of the operating mode
- System protection
- Communication and remote control

Operator level : LEDs on the front panel of the module provide operating status, fault indication and diagnostics information.

Parallel communication and remote control :

Remote change of set point, and remote on/off control. Optional relay cards provide potential free contacts for seven status and fault indicators per circuit. Serial communication and remote control :

A TTY serial communication port allows binary operating status information and command transmission and integration of the chiller into Building Management Systems.

The control panel section further includes oil pressure, discharge pressure and low pressure pressostats and terminal strips. The RCM module is visible through a window in the control panel access door. Oil pressure, low pressure and high pressure gauges are provided on the panel.

Refrigerant circuit

Including filter-dryer, sight glass, solenoid valve and thermostatic expansion valve. Compressor discharge service valve and liquid line shut-off solenoid valve. Refrigerant circuit factory pressure and leak tested, dehydrated and charged .

Accessories and options

- Rubber-in-shear or spring type isolators.
- Hot gas muffler (standard on CGWD 101 to 104).
- Disconnect switch.
- Condenser and evaporator mismatch arrangements.
- Factory-installed hot gas bypass.
- Relay card for remote status and failure indication.
- Compressor sound attenuating enclosure, factory installed.

Factory testing

CGWD are fully factory run tested. Unit operation and all controls are thoroughly checked out before shipment.

Shipment.

CGWD ship on a wooden skid with the refrigerant and oil operating charge.

CCUD compressor-chiller units ship on a wooden skid with oil operating charge and refrigerant holding charge.

Quality Assurance

The Quality Management System applied by Trane has been subject to independent third party assessment and approval to BS 5750 Part 1, I.S.O. 9001, and N.E.N. 2646.

The products described in this catalogue are designed, manufactured, and tested in accordance with the approved system requirements as defined in the Trane Quality Manual.

Subject to modifications.

Sales offices in United Kingdom and Eire

Birmingham

24, New John Street West,
Newtown, Birmingham B19 3NB
Phone : (021) 359 6354/6 - Telex : 336 995 G

Bristol

Dockgate House, 151 Hotwell Road, Hotwells,
Bristol BS8 4RU
Phone : 0272 297761 - Telex : 44241 G

Dublin

8, The Mall, Lucan, Co. Dublin
Phone : (0001) 282965 - Telex : 721 472 E

Glasgow

10 Napier Court, Wardpark North Industrial
Estate,
Cumbernauld G68 0LG
Phone : Cumbernauld (02367) 36927 -
Telex : 779 361 G

London

162, Windmill Road West,
Sunbury on Thames, Middlesex TW 16 7HB
Phone : (0932) 780321 - Telex : 927 357 G

Manchester

Enterprise Trading Estate, Guinness Road,
Trafford Park
Manchester M17 1SD
Phone : (061) 848 0491 -
Telex : 937400 G (Ref. 29768001)

Newcastle

218 Rothbury Terrace, Heaton
Newcastle Upon Tyne NE6 5DF
Phone : (091) 276 2000 - Telex : 537 259 G

Nottingham

60, Lenton Boulevard,
Nottingham NG7 2EN
Phone : (0602) 412212 - Telex : 377 552 G



TRANE™

B 47 CA 002 E - 0288