



LIQUID LEVEL CONTROLLER



The Liquid Level Controllers are available in 2 models.

Type LC 101 AI & 39FI

The Liquid Controller consists of a float chamber and an electronic controller. It can be used on all non corrosive liquids such as Ammonia, Toluene, Freon etc.

The electronic controller has a bar graph display module installed to continuously display the rising & falling of liquid level inside the float chamber. The level controller is used to control the liquid level in various refrigeration applications.

These level controllers can also be used as a protection against too high & too low liquid levels.

SPECIFICATIONS :

- Refrigerant R717 (NH₃), R22, R502, R404a etc.
- Differential Adjustable between 10 to 40 mm.
- Max operating pressure for float housing 19 bar.
- Enclosure for float housing IP 65
- Amplifier / controller is available in IP 65 wall mounting enclosure or DIN 1/4 for panel mounting enclosure.
- Float Chamber and Amplifier are also available in flame proof enclosure.

FLOAT SWITCH



TYPE FKS 39

FKS 39 is an electro - mechanical float switch designed to provide a reliable , electro - mechanical response to liquid level changes.

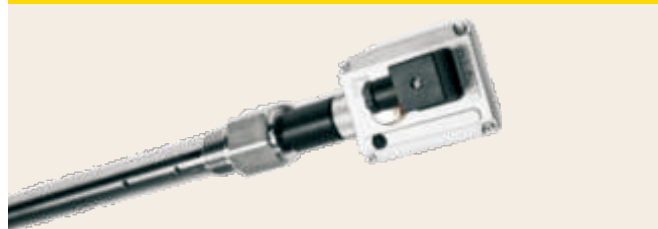
The simple and basic design ensures long lifetime performance and reliable operation for many applications.

FKS 39 can control liquid level in vessels and accumulators or can be used as a low / high level safety alarm.

FEATURES

- Based on **MANIK** float type **39F**.
- DIN , ANSI and FPT / NPT flanges
- The switch box can be placed in any position top of float housing for ease of installation.
- Adjustable liquid level differential switch point.
- Electro magnetic micro switch, mechanically activated.
- The complete switch box can easily be replaced without any interference with the refrigeration system.
- Switch box supplied with a DIN plug for easy installation and service.
- Flanges included.
- Float Switch are available in flame proof enclosure.

ELECTRONIC LEVEL TRANSMITTER - TYPE FKS 41



The level transmitter type FKS 41 can measure the liquid level in containers with refrigerant. FKS 41 can be mounted in a stand-pipe to the container, and the pipe is designed so that oil cannot settle at its bottom. FKS 41 transmits an active 4-20 mA signal which is proportional to the liquid level. The 4-20 mA signal from FKS 41 can be connected to a controller which then will control the liquid level.

PRINCIPLE : The rod consists of two pipes - an inner pipe and an outer pipe. The liquid will flow up between the two pipes, and by measuring the electrical capacitance between the pipes it is possible to register how much of the rod is covered by liquid. The signal is transmitted as a current signal from 4 to 20 mA, 4 mA when the rod does not register liquid - and 20 mA when the entire rod is surrounded by liquid. The rod comes calibrated from the factory to NH₃, so that it will cover 4 to 20 mA throughout the rod's whole measuring range. Any disturbances in connection with the level measurement will be damped internally.

SOLENOID VALVES TYPE MS7A & MS8A

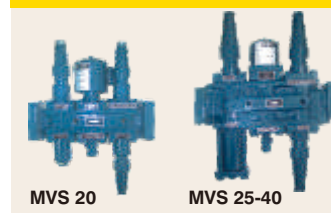


These high quality valves are compact, strong and reliable. Stainless steel pistons with Teflon seals are used to overcome the problem of valve sticking due to dirt or lack of oil. Pilot seats are polished stainless steel on Teflon discs and main valve seats align for tight closing. These valves can be used in liquid, suction, hot gas, discharge, pump lines etc., where a strong opening, tight closing valve is required.

FEATURES :

- All Valves are spring closing.
- All Valves have Teflon seat. One Solenoid Coil fits all Valves
- Close-coupled strainers are available
- Non Asbestos gasket, 300 PSI (21 bar) MOPD
- MS8A 1/2" (15 mm) Ductile Iron Body
- MS7A 3/4" - 1 1/4" (20 - 32 mm) Ductile Iron Body.
- Suitable for Ammonia, CO₂, R-22, R134a, R404a and other refrigerants

MULTIFUNCTION VALVE STATION



The Multifunction Valve Station includes several functions in one block, which can replace of series a conventional mechanical and electro mechanical operated valves.

The Valve Station not only provides a number of

advantages in the design phase of a refrigeration plant but also in the installation service and maintenance.

- Stop Valve • Solenoid Valve • Filter • Hand Expansion Valve
- Non Return Valve • Single Block for all Function
- Any two flange Connection • Easy replacement / Service
- One Station for all Reduces Welding Joints

SOLENOID VALVES TYPE SVRA



SVRA-3 to SVRA-40

SVRA is a direct or servo operated solenoid valve for liquid, suction and hot gas lines with ammonia or fluorinated refrigerants.

SVRA valves are supplied complete or as separate components, i.e. valve body, coil and flanges can be ordered separately.

SVRAT is an assisted lift, servo operated solenoid valve for liquid, suction and hot gas lines with ammonia and fluorinated refrigerants.

SVRAT is specially designed to open - and stay open - at a pressure drop of 0 bar. The SVRAT solenoid valve is thus suitable for use in all plant where the required opening differential pressure is 0 bar.

SVRA is available as components, i.e. valve body, flanges and coil can be ordered separately, or as complete valve

SVRA / SVRAT 10, 15, 20, 25, 32 & 40 all have spindle for manual operation.

SVRA solenoid are available in flame proof enclosure.

SOLENOID VALVES TYPE SPML



SPML valves are servo-operated main valves with screwed-on pilot solenoid valves. SPML valves use an external pressure source for opening (which means that no differential pressure across the SPML valve is required in order to maintain open state). This makes the valve especially suitable for low-pressure suction lines.

The SPML valves can be used in all types of refrigeration systems:

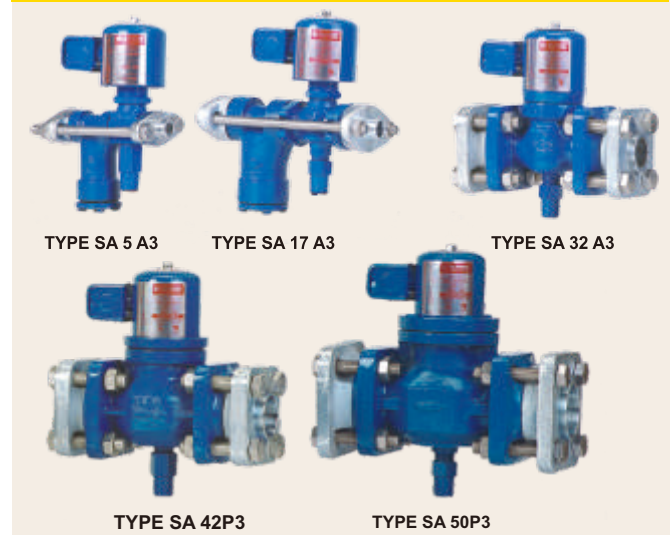
- Direct expansion
- Pump recirculation
- Natural circulation

Within their specified pressure and temperature ranges SPML valves can be used for fluorinated refrigerants (R 22, R 134a, R 404a, R 12, R 502, etc.) or ammonia (R 717)

SPML pilot-operated solenoid valves can be installed in:

- Suction lines
- Return lines (liquid/vapour)
- Pressure-equalising lines
- Bypass lines

SOLENOID VALVES FOR AMMONIA SA SERIES



Type SA Series

Type SA5 solenoid valve is the direct acting type & type SA 17, SA 32, SA 42, SA 50 are higher capacity pilot operated solenoid valves for refrigeration & air conditioning applications.

SPECIFICATIONS :

- Refrigerants : R717 (NH₃), R22, R134A etc.
- Temperature of medium -40°C to + 80°C
- Single coil (type KC -3) for all SA series valves.

SOLENOID VALVES TYPE SPMLX, TWO-STEP ON/OFF



SPMLX are 2-step servo-controlled main valves with screwed-on pilot solenoid valves. SPMLX valves use an external pressure source for opening (which means that no differential pressure across the SPMLX valve is required).

SPMLX are used in suction lines for the opening against high differential pressure, e.g. after hot gas defrost in large industrial refrigeration systems with ammonia or fluorinated refrigerants.

SPMLX, opens in two steps :

Step one opens to approx. 10% of the capacity, when the pilot solenoid valves are activated.

Step two opens automatically after the pressure differential across the valve reaches approximately 1.5 bar.

PRESSURE AND TEMPERATURE REGULATORS TYPE SPM & PILOT VALVES



Main valves, type SPM 1 and SPM 3

Main valve type SPM is specially developed to regulate pressure and temperature in refrigeration, freezing and air conditioning plants with fluorinated refrigerants and ammonia. SPM is a pilot operated main valve with screwed-in pilot valves or pilot valves mounted in an external pilot line. Main valves type SPM are used in refrigeration plant with dry evaporation, pump circulation, natural circulation. The regulator is available in two variants, SPM 1 and SPM 3. SPM 1 is designed to accept one pilot valve either screwed-in or mounted in an external pilot line. SPM 3 will accept three screwed-in pilot valves or pilot valves mounted in an external pilot line. Thus several functions can be performed by the same valve.

AUTOMATIC LIQUID DRAINER - TYPE ALD



The Type ALD Automatic Liquid Drainer is a combination of a Type FKS39 Float Switch, a 13mm (1/2") Port Size Type SA17A3 Solenoid Valve Assembly, a 3/4"

and a 1/4" Hand Expansion Valve, as well as necessary pipe and fittings, complete for field assembly as shown on Figure 1. All are heavy duty devices intended for use with Ammonia, R-22, R-502 and other common refrigerants.

Purpose : It is the purpose of the Type ALD Automatic Liquid Drainer to permit flow of liquid refrigerant only and to prevent the flow of vapor refrigerant. It is intended for use in draining liquid from defrosting evaporators, or heat recovery condensers, into a lower pressure portion of the system.

CONSTANT PRESSURE VALVE SCVMD



INTRODUCTION

SCVMD is a constant pressure regulator for refrigeration and freezing plant in applications such as;

- Hot gas defrosting (drain lines)
- Refrigerant pump bypass (to ensure min. flow in refrigerant pumps).

PILOT VALVES



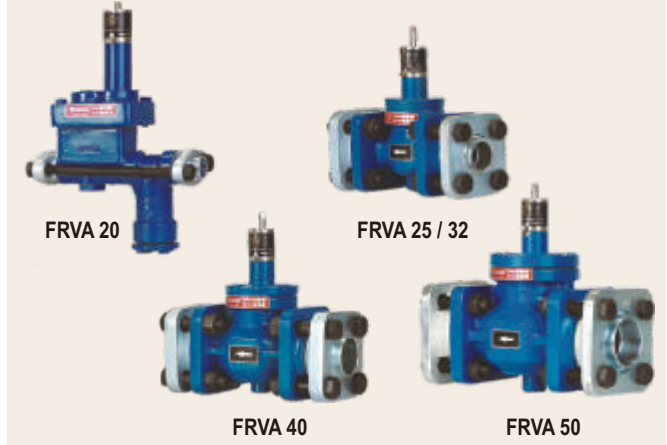
The pilot valves can be used for all sizes of SPM valves.

A pilot valve program contains:

- Pressure controlled pilot valve type SCVP(LP),
- Pressure controlled pilot valve type SCVP(HP),
- Differential pressure controlled pilot valve, type SCVPP(LP),
- Differential pressure controlled pilot valve type SCVPP(HP),
- Solenoid pilot valve type SVM-NC and SVM- NO,
- Outlet pressure regulating valve type SCVPO,
- Pressure operated pilot valve with reference pressure connection type SCVC
- Pilot Solenoid valve with reference pressure connection type SCVC.

The pilot valves can perform the following functions: Constant pressure regulation, Capacity regulation, Crank case pressure regulation, Refrigerant pressure regulation, solenoid valve, solenoid controlled pressure regulation.

CONSTANT FLOW VALVE



Automatic Liquid Flow regulator Type FRVA For Mechanical Pumped (Ammonia) Liquid Overfeed Systems

- External Adjustment
- Easy Setting Scale
- Eliminates System Balancing
- Integral Check Valve
- "Frost Free" Neck
- Design Pressure (MRP): 27.6 bar (400 psig)
- Available up to 400 TR systems.
- Automatic Flow Regulator, is used as a liquid control device for Ammonia Overfeed Systems.

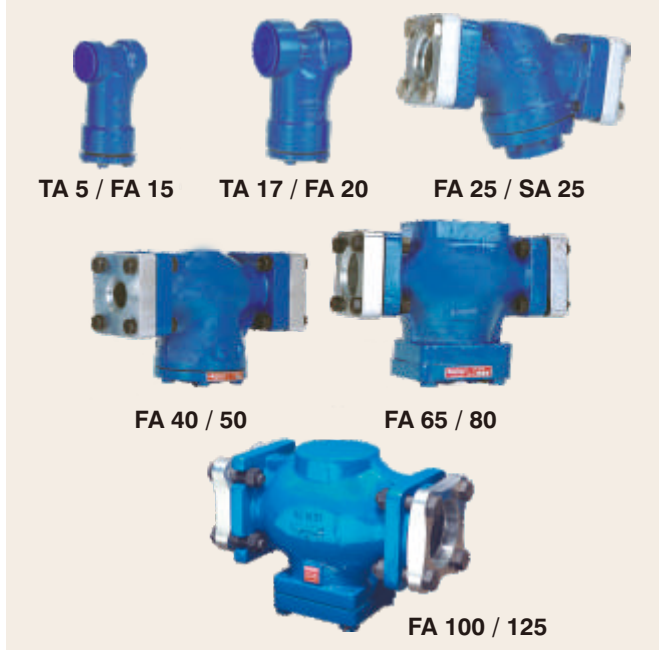
This Automatic Flow Regulator, once set, maintains a constant flow rate of liquid to the evaporator. It also serves as a check valve to prevent back flow into the liquid line from the evaporator during pressure reversals which occur during hot gas defrost.

DEFROST RELIEF REGULATOR / OVERFLOW VALVES, TYPE OFV 20 - 25

OFV are angle-way over flow valves, which have adjustable opening pressure and cover the differential pressure range (ΔP): 2 - 8 bar (29 - 116 psi). The valve can be closed manually, e.g. during plant service and has back seating, enabling the spindle seal to be replaced with the valve still under pressure. The valves are especially designed to prevent fluttering due to low velocity and/or low density. In consequence it is possible to apply the valves with wide fluctuations in capacity demands, i.e. from maximum performance to part load. A flexible O-ring provides perfect sealing over the seat.



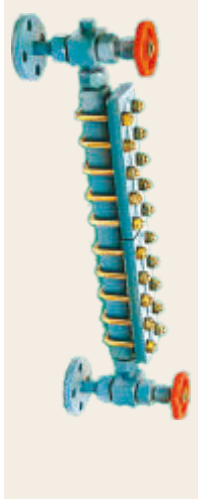
LINE STRAINER



STRAINERS TYPE TA / FA

Strainer type TA with interchangeable filter insert is used in lines carrying fluorinated refrigerants, ammonia, water, brine, oil, and gas. Retains contaminants, e.g. slag, and weld beads and swarf. Strainers are available from 15NB to 125NB size with counter flanges.

REFLEX / FROST FREE LIQUID LEVEL GLASSES - MLLG 400 - 2000



MLLG are liquid level glasses in ductile steel which meets the strictest requirements on industrial and marine refrigeration installations. The liquid level glasses are with stop valves equipped with handwheel (MLLGS)

- Refrigerants Applicable to HCFC, HFC and R717 (Ammonia).
- Temperature range $-10/+100^{\circ}\text{C}$ ($-14/+212^{\circ}\text{F}$) or $-50/+30^{\circ}\text{C}$ ($-58/+86^{\circ}\text{F}$)
- Maximum operating pressure: 25 bar g (363 psi g)
- Equipped with boron silicate glass, hardened by an accurately controlled heat treatment process

QUICK CLOSING OIL DRAIN VALVE, TYPE QDV 15



QDV is a quick closing oil drain valve, designed particularly for draining oil from systems containing refrigerant (ammonia) under pressure. The valve will close immediately on release of the handle, thus protecting user and environment against unnecessary refrigerant leaks.

In order to prevent hydraulic pressure building up between the stop valve and the QDV an integral relief device is included as part of the cone arrangement, which will open at approx. 5 bar g (363 psig).

QDV is designed to meet the safety demands specified by national and international authorities within industrial refrigeration.

SAFETY RELIEF VALVES AND DUAL MANIFOLD



Type MSFA 15 + DSV 2 & Type SH 5601 + DSV 3, SFV 20 / SFV 25 + DSV 4

SFV is standard, back pressure dependant safety relief valve in angle-way execution, specially designed for protection of vessels and other components against excessive pressure.

The valve is designed to meet the strict quality demands and safety requirements for refrigeration installations, specified by the international classification societies.

The valve is recommended as an external and internal safety relief valve in refrigeration plants. The spring housing is closed tightly to avoid refrigeration leakage. The valve can be delivered with set pressure between 10 to 25-bar g (145 and 363 psi g).

Valves can also be supplied with non-standard set pressure between 10 to 25-bar g (145 & 363 psi g) in 0.5 bar g (7.25 psi g) increments, to suit the customers' specific requirements. Dual manifold is also available.

Wide range is available from 15 mm to 25 mm of safety valve are 13 mm to 32 mm for dual manifold.

NON RETURN VALVES TYPE SNRVA



NON RETURN VALVES TYPE SNRVA

Check valve type SNRVA can be used in liquid, suction and hot gas lines in refrigeration and air conditioning plant with ammonia. SNRVA can also be used in refrigerating systems with fluorinated refrigerants. When the SNRVA is used in liquid lines where cold, thick oil or impurities may be present, it is recommended that the standard spring be replaced by a special spring. Available from 15NB to 100NB size.

FEATURES

- Ensures correct direction of flow ,
- Prevents back-condensation from warm evaporator to cold evaporator.
- Fitted with damping piston that makes the valves suitable for installation in lines where pulsation can occur, e.g. in the discharge line from the compressor.

STOP VALVES - MSVA

Type MSVA-S



MSVA Stop Valves are available in angleway and straightway versions and with Standard neck (MSVA-S). The stop valves are designed to meet all industrial refrigeration application requirements and are designed to give favourable flow characteristics and are easy to dismantle and repair when necessary.

The valve cone is designed to ensure perfect closing and withstand a high system pulsation and vibration, which can be present specifically in the discharge line.

FEATURES

- Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO₂).
- Can be used in chemical and petro-chemical applications.
- Modular Concept:
 - Each valve housing is available with several different connection types and sizes.
 - Possible to convert MSVA-S any other product in the MSVA-L family (regulating valve, stop check valve, check valve or strainer) just by replacing the complete top part.
- Fast and easy valve overhaul service. It is easy to replace the top part and no welding is needed.
- Optional accessories:
 - Heavy duty industrial hand wheel for frequent operation.
 - Cap for infrequent operation.
- Available in angleway and straightway versions with Standard neck
- Each valve type is clearly marked with type, size and performance range.
- The valves and caps are prepared for sealing, to prevent operation by unauthorized persons, using a seal wire.
- Internal metal backseating:
 - DN 6 - 65 (¼ - 2½ in.) Internal PTFE backseating:
 - DN 80 - 150 (6 in.)
- Can accept flow in both directions.
- Housing and bonnet material is low temperature steel according to requirements of the Pressure Equipment Directive and other international classification authorities.
- Equipped with stainless steel bolts. Max. working pressure: 52 bar g (754 psi g)
- Temperature range: -60/+150°C (-76/+302°F)

STOP CHECK VALVES AND CHECK VALVES - MSCA / MCHV

TYPE : MSCA & MCHV



MSCA are check valves with a built-in stop valve function. MCHV are check valves only. MSCA / MCHV are available in angle way versions.

The valves are designed to open at very low differential pressures, allow favourable flow conditions and are easy to disassemble for inspection and service.

The MSCA is equipped with vented cap and has internal backseating enabling the spindle seal to be replaced whilst the valve is still under pressure.

Laser cut V-ports provide excellent opening characteristics (MSCA / MCHV 50-125).

The valve cone has a built-in flexibility to ensure a precise and tight closing towards the valve seat.

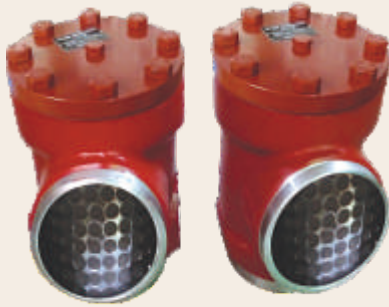
A well balanced dampening effect between the piston and the cylinder gives an optimal protection during low loads and against pulsations.

FEATURES

- Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO₂).
- Can be used in chemical and petro-chemical applications.
- Modular Concept:
 - Each valve housing is available with several different connection types and sizes.
 - Possible to convert MSCA or MCHV to any other product in MSVL family (regulating valve, stop valve or strainer) just by replacing the complete top part.
- Fast and easy valve overhaul service. It is easy to replace the top part and no welding is needed.
- Designed to open at a very low differential pressure of 0.04 bar (0.58 psig).
- Designed with a built-in damping chamber preventing valve flutter in case of low refrigerant velocity and/or low density.
- Each valve is clearly marked with type, size and performance range.
- Easy to disassemble for inspection and service.
- Internal backseating enables replacement of the spindle seal whilst the valve is active, i.e. under pressure.
- Optimal flow characteristics ensuring quick opening to the fully open position.
- Protection against pulsation by built-in damping facility.
- Housing and bonnet material is low temperature steel according to requirements of the Pressure Equipment Directive and other international classification authorities.
- Equipped with Stainless steel bolts. Max. working pressure: 52 bar g (754 psi g)
- Temperature range: -60°C/+150° (-76°F/+302°F)

FILTER - MFIA

TYPE MFIA



*Mesh is the number of threads per inch. μ (microns) is the distance between two threads ($1\mu = 1/1000$ mm).

MFIA filters are a range of angleway and straightway filters, which are carefully designed to give favourable flow conditions. The design makes the filter easy to install, and ensures quick filter inspection and cleaning.

MFIA filters are used ahead of automatic controls, pumps, compressors etc., for initial plant start-up and where permanent filtration of the refrigerant is required. The filter reduces the risk of undesirable system breakdowns and reduces wear and tear on plant components.

MFIA filters are equipped with a screen mesh of stainless steel, available in sizes 100, 150, 250 and 500 μ (microns*), (US 150, 100, 72, 38 mesh*).

FEATURES

- Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO₂). Can be used in chemical and petro-chemical applications.
- Modular Concept:
 - Each valve housing is available with several different connection types and sizes.
 - Possible to convert MFIA filters to any other product in MSVL family (Stop valve, regulating valve, stop check valve or check valve) just by replacing the complete top part.
- Fast and easy overhaul service. It is easy to replace the top part and no welding is needed.
- Filter net of stainless steel mounted direct without extra gaskets means easy servicing.
- Two types of filter inserts are available:
 - A plain insert of stainless steel.
 - A pleated insert (DN 15-125) with extra large surface, which ensures long intervals between cleaning and low pressure drop.
- MSFIA 15-40 ($\frac{1}{2}$ – 1 $\frac{1}{2}$ in.):
A special insert (50 μ) can be used in combination with a standard version when cleaning a plant during commissioning.
- MSFIA 50-150 (6 in.):
A large capacity filter bag (50 μ) can be inserted for cleaning plant during commissioning.
- MSFIA 65-150 (6 in.) can be equipped with a magnetic insert for detention of iron particles and other magnetic particles.
- Each filter clearly marked with type, size and performance range
- Housing and bonnet of low temperature steel in accordance with the requirements of the Pressure Equipment Directive and those of other international classification authorities
- Temperature range:
–60/+150°C (–76/+302°F)
- Max. working pressure: 52 bar g (754 psi g)

REGULATING VALVES - MREG

Type MREG-A and MREG-B



MREG-A and MREG-B are angleway and straightway hand regulating valves, which act as normal stop valves in closed position.

The valves are available in two different versions – MREG-A and MREG-B designed for regulation purposes in liquid and expansion lines.

The valves are designed to meet the strict quality requirements on refrigerating installations specified by the international classification societies and are carefully designed to present favourable flow conditions and accurate linear characteristics.

MREG-A and MREG-B are equipped with vented cap and internal backseating enables replacement of the spindle seal whilst the valve is active, i.e. under pressure.

FEATURES

- Applicable to HCFC, HFC, R717 (Ammonia) and R744 (CO₂). Can be used in chemical and petro-chemical applications.
- Modular Concept: – Each valve housing is available with several different connection types and sizes. – Possible to convert MREG-A or MREG-B to any other product in the MSVL family (stop valve, stop check valve, check valve or strainer) just by replacing the complete top part.
- Fast and easy valve overhaul service. It is easy to replace the top part and no welding is needed.
- Designed to ensure perfect regulation
- Internal backseating enables replacement of the spindle seal whilst the valve is active, i.e. under pressure.
- Easy to disassemble for inspection and possible repair.
- Max. operating pressure: 52 bar g (754 psi g)
- Temperature range: –60/+150°C (–76/+302°F)
- Acts as a normal stop valve in closed position.
- Housing and bonnet material is low temperature steel according to requirements of the Pressure Equipment Directive and other international classification authorities.

SPARES FOR ANGLE / STRAIGHT STOP VALVE



We manufacture spares for stop valves like Cone, Packing Gland, Spindles for you valves from 15 NB to 200 NB

AMMONIA DEHYDRATOR (WDO)



System Cleaner removes the Water, Dirt and Oil from Ammonia System that air purger leaves behind

The MANIK WDO is the only system cleaner that boosts

- Lower Installation Cost
- Self Regulating Operating
- Shortest Payback Time
- Energy-Neutral Operation
- Very Low Maintenance

How you can tell if there's water in your system ?

Air-purgers only removes non-condensibles like air. If your air-purger has been venting air, it's been leaving behind the water vapour that's always in the air. If your recirculating evaporator is operating a few degrees warmer than the pressure indicates, this could be due to water in Ammonia. If water comes out of your oil pot before the oil, there is water in your system.

You can easily measure the concentration of Water in your system with the graduated Ammonia Sampling Container.

Compressor Exit Temperature Increase

Water Present	0%	10%	20%
Comp Exit Temp	0°F	10°F	23°F

AUTOMATIC AIR PURGER FOR REFRIGERATION PLANTS



Type SGP - 2E

Removes Non condensable gases / Air from refrigeration plants.

Fully factory assembled unit.

Can be used as multi point purger with **MANIK** make

"AIR PURGER CONTROLLER"

No need to install above condenser / receiver.

Can be installed in plant room / ground level.

All standard MANIK controls are externally installed, can be serviced / replaced externally.

ADVANTAGES OF AIRPURGER

- Fully automatic gas purger for refrigeration plants
- Automatic purger continually function to scavenge and remove air from System
- Maintains condensing temperature at nearly optimum operating conditions
- Reduces the concentration of non-condensable gases to a negligible Percentage
- No need of separate refrigeration system
- Eliminates the labour associated with personnel regularly removing air by manual operation

COMPRESSOR / CHILLER CONTROLLER



MANIK Engineers has introduced new series of Microcontroller based controllers. The new MPRCC is complete controller to operate compressors / chiller packages / condensing units. It can be used for Multi Cylinder compressor or with RACK system of multiple compressors.

The inbuilt features are

- Four Analog inputs (4 to 20mA) for pressure transmitter e.g. compressor suction, discharge, oil and intermediate
- Four Digital inputs (potential free)
- Six Relay Outputs for Compressor Capacity Control
- Solenoid Valves and Compressor start stop
- Interlock for compressor start command
- Inbuilt time delay for Differential Oil trip
- Adjustable time delay for capacity control solenoid valves
- Adjustable Neutral Zone, Inter Stage Differential, Calibration
- Optional RS232 / RS485 port for communication
- Optional available Software for PC monitoring

Compact Single Enclosure unit. can be fitted into the panel

Operates directly on 230VAC, 50Hz Supply. No need of auxiliary supply units

Simple to use key board

16 X 2 Line LCD Display with Backlight

FROST CONTROL



Frost Control is a complete electronic controller with real time for hot gas / electrical / water defrost system from MANIK Engineers.

FEATURES

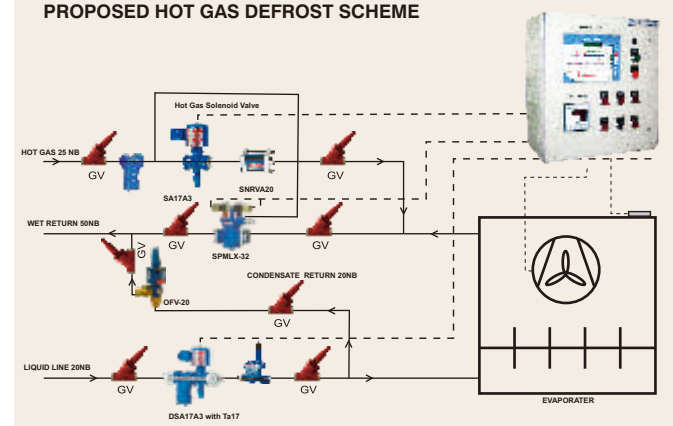
The MANIK Frost Control defrost control system is designed to control the evaporator operations for large ammonia and

halocarbon refrigeration systems.

The MANIK Frost Control performs the functions of following independent control systems:

- Evaporator valve group status monitor
- Multi-Function defrost clock
- Remote communication
- Automatic defrost cycle with real time clock

PROPOSED HOT GAS DEFOST SCHEME



SCREW COMPRESSOR CAPACITY CONTROLLER TYPE FKD-40A+41A



FKD-40A+41A is a screw compressor capacity controller widely used with various screw compressors such as KPC-Howdon, Alfa-Laval, Stal, Dunham Bush, APV- J & E Hall, KG Khosla, Sabroe, Cooling Systems CSI etc.

FKD-40A moves capacity slide by operating loading/unloading solenoid valves.

FKD-40A can be used either with RTD (Pt100 / Pt1000) input or pressure transmitter input (4-20mA)

FKD-41A is current limiter which allows to control motor current from 10% to 100% of rated current.

MICROCONTROLLER BASED COMPRESSOR CAPACITY CONTROLLER TYPE FKD331

The new microcontroller based FKD331 is a multistage electronic capacity controller for multi-cylinder reciprocating compressor or rack systems.

LCD Based unit has easy to use settings, like Set point -Low pressure (LP), Neutral Zone (NZ) & Interstage timer.

One Analog input (4 to 20mA) for pressure transmitter e.g. compressor suction or RTD Pt100

One Digital input (potential free) for Compressor On feedback

Four / Six Relay Output for Compressor Capacity Control Solenoid Valves and Compressor trip

Adjustable Neutral Zone, time delay, Calibration Optional RS232 / RS485 port for communication Optional available Software for PC monitoring Function Capacity regulation

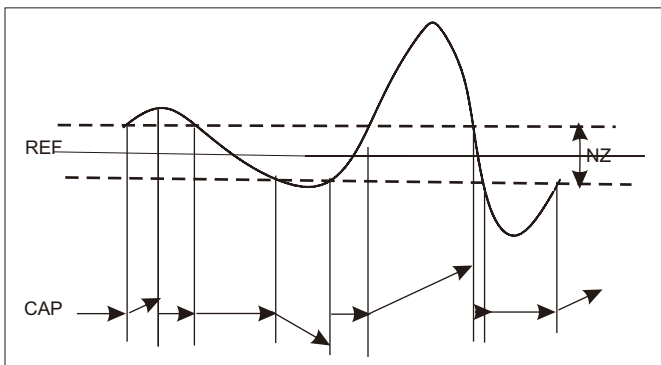
The cut-in capacity is controlled by signals from the connected pressure transmitter and the set reference.

Outside the reference a neutral zone is set where the capacity will neither be cut in nor out.

Outside the neutral zone the capacity will be cut in or out if the regulation registers a will take place with the set time delays.

If the pressure however "approaches" the neutral zone, the controller will make no changes of the cut-in capacity.

Cut-in of steps are defined for either sequential or cyclic operation.



MICROCONTROLLER BASED COMPRESSOR CAPACITY CONTROLLER TYPE MPRCC

The new microcontroller based MPRCC is a multistage electronic capacity controller for multi-cylinder reciprocating compressor or rack systems.

LCD Based unit has easy to use settings, like Set point -Low pressure (LP), Neutral Zone (NZ), Inter-stage differential (ISD) & Interstage timer.

One Analog input (4 to 20mA) for

pressure transmitter e.g. compressor suction or RTD Pt100

One Digital input (potential free) for Compressor on feedback

Four / Six Relay Output for Compressor Capacity Control Solenoid Valves and Compressor trip

Adjustable time delay for capacity control solenoid valves

Adjustable Neutral Zone, Inter Stage Differential, Calibration

Optional RS232 / RS485 port for communication

Optional available Software for PC monitoring



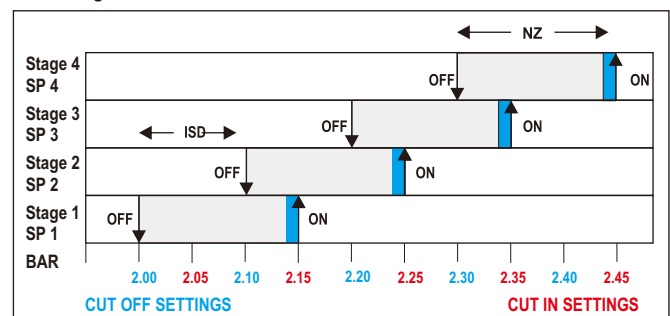
Typical application

PRCC-04 unit stage control:

Set Point 2.00 bar

Neutral Zone 0.15 bar

Inter-Stage Differential 0.10 bar



COMPRESSOR CAPACITY CONTROLLER TYPE PRCC & RCC



RCC is reciprocating compressor controller widely used with Kirloskar, Alfa Laval, Sabroe, Batliboi, ACCEL reciprocating compressors. RCC works by operating loading / unloading solenoid valves of a multi cylinder compressor system.

RCC can be used either with RTD (Pt 100 / Pt 1000) Input or pressure transmitter input (4 to 20mA).

The controller can be supplied with 4,6,8 steps.

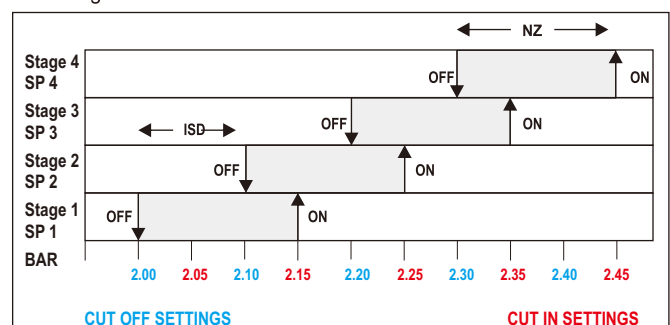
Typical application

PRCC-04 unit stage control:

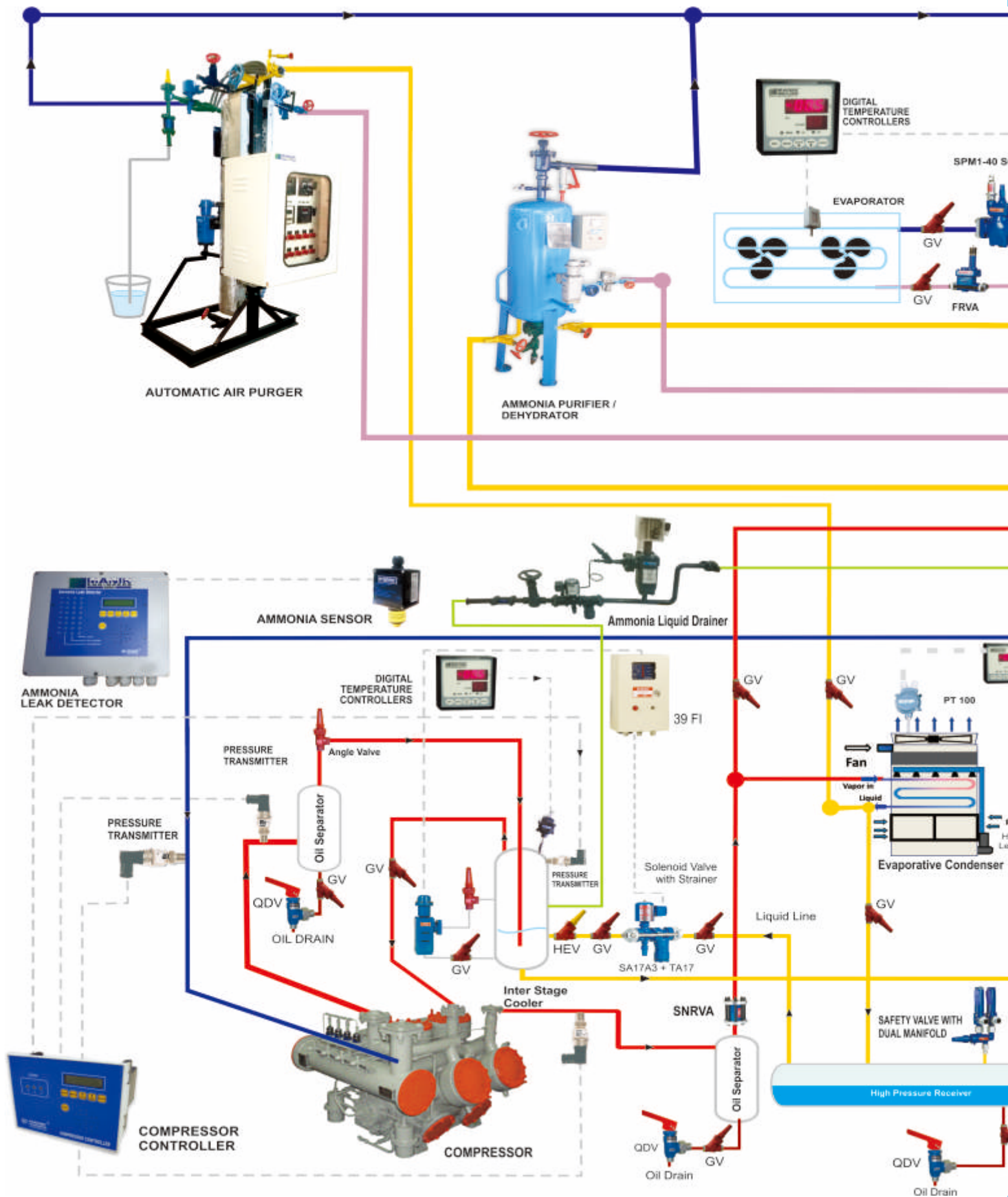
Set Point 2.00 bar

Neutral Zone 0.15 bar

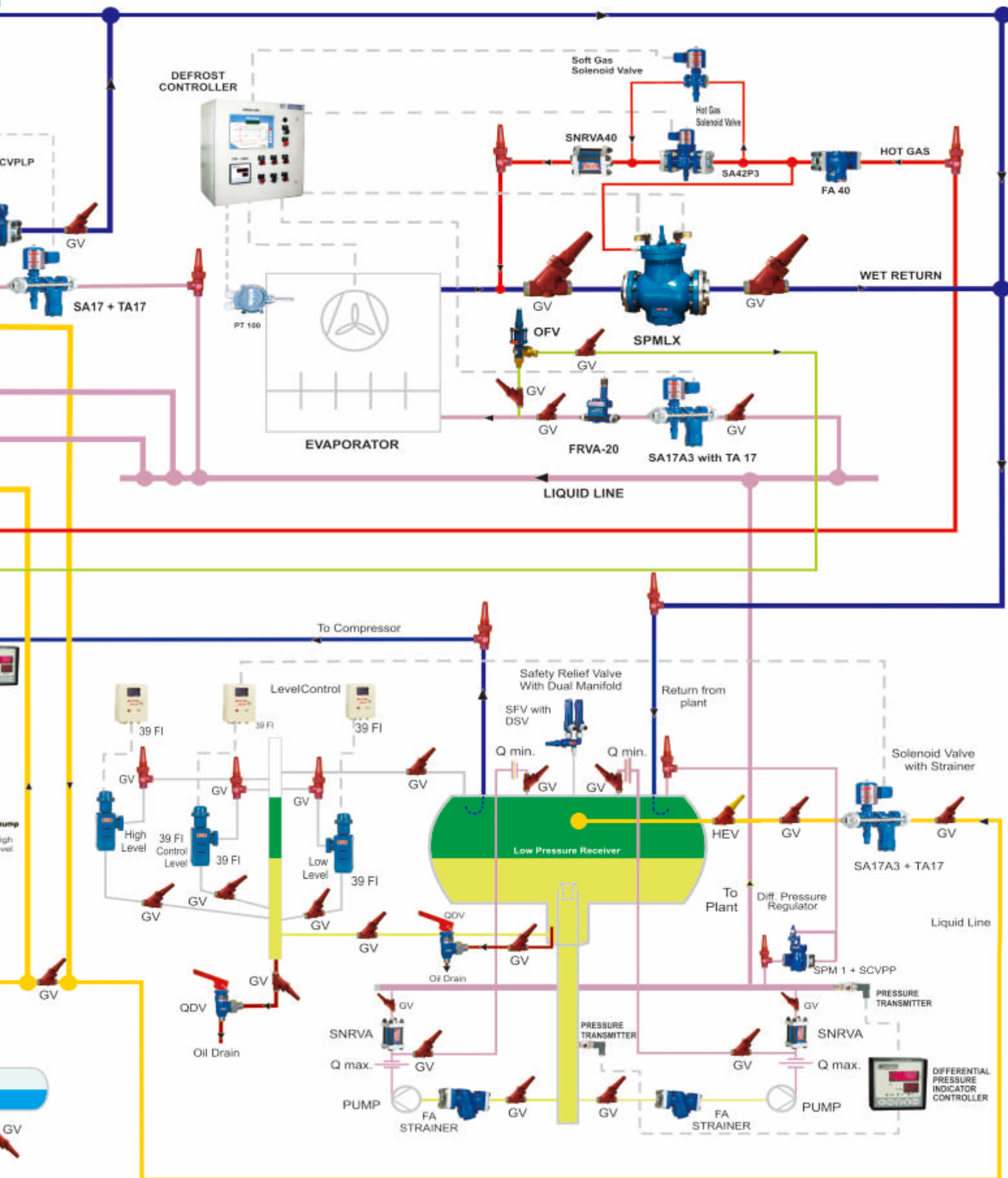
Inter-Stage Differential 0.10 bar



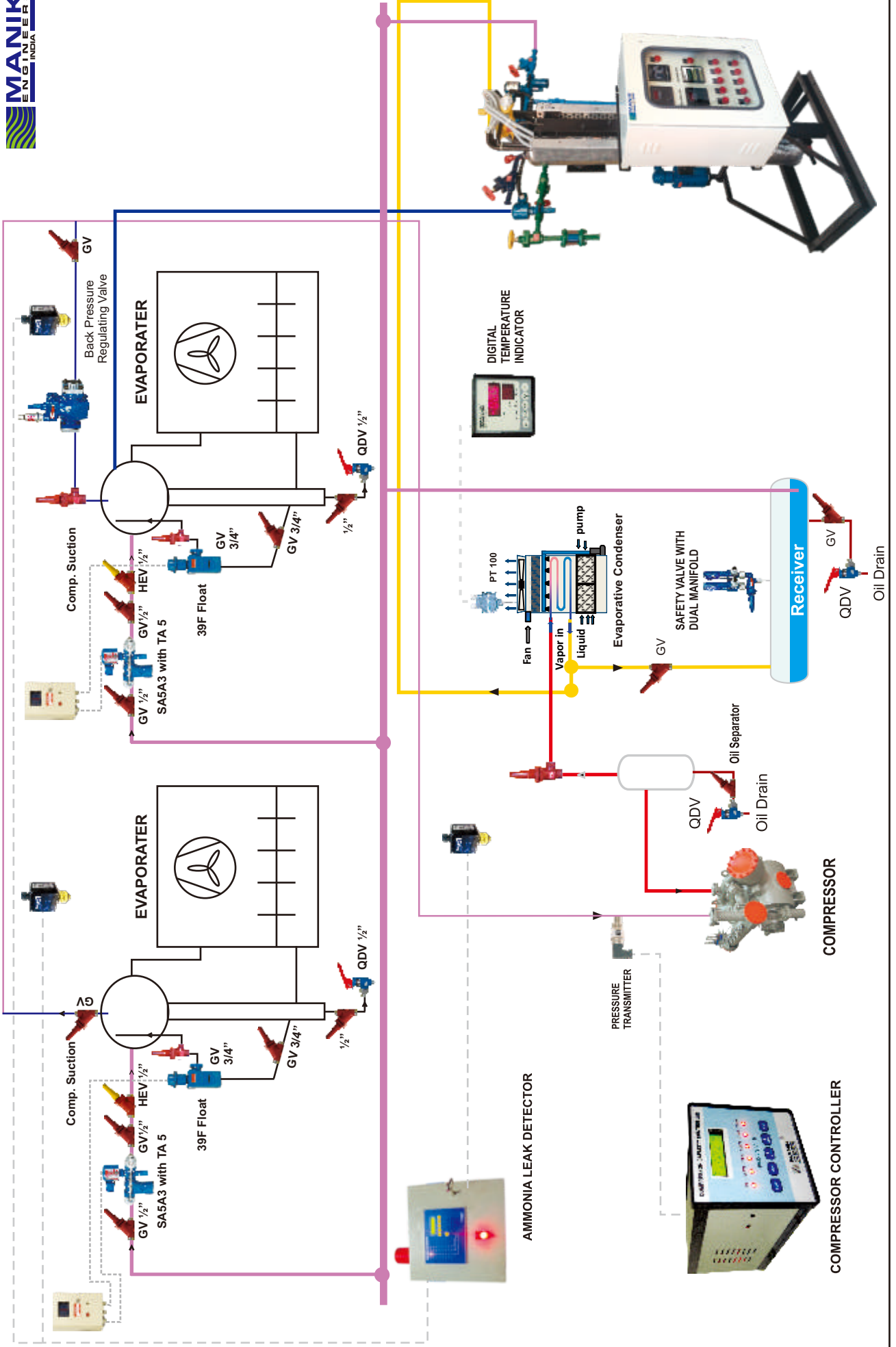
Ammonia Liquid Overfeed



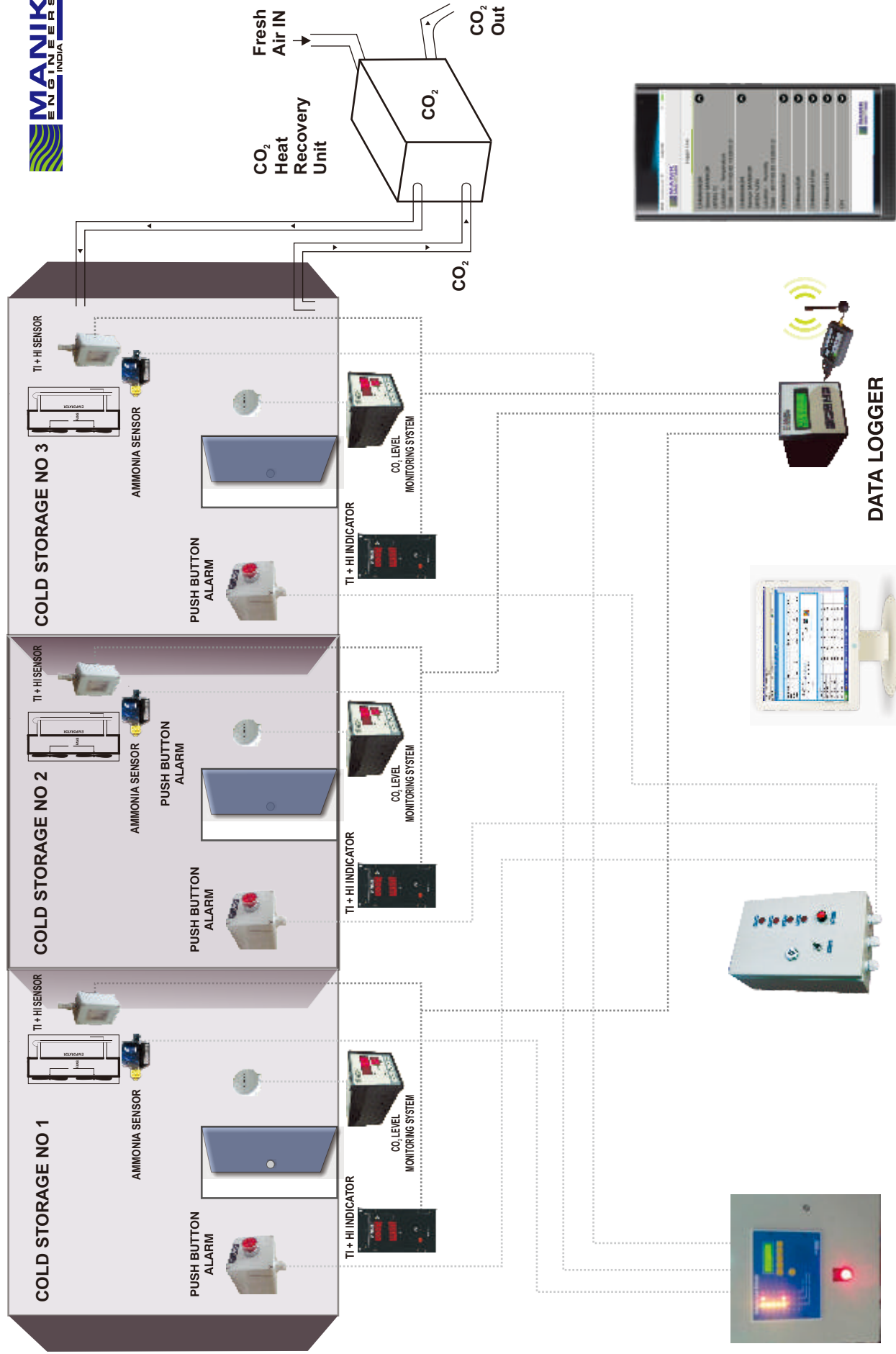
Industrial Refrigeration System



AMMONIA GRAVITY FEED SYSTEM



COLD STORAGE AUTOMATION



AMMONIA LEAK DETECTOR



Single point and multipoint Alarm Units
Operates on 230VAC, 50Hz, with inbuilt power supply for Ammonia Transmitters
In-built Alarm Hooter
LED Indication for Each Channel Contamination,
Early Warning and Alarm Status
Robust case for long life in harsh environments
Continuous monitoring
Low zero point drift
Positioning stable
Long life sensor
Easy maintenance / calibration
Reverse polarity protected
Overload protected
4 – 20 mA analog signal output from Transmitter

DATA LOGGER



Multipoint Temperature / Pressure / Humidity with printer interface are available to monitor / store / on line print with respect to real time.

WEB BASED DATA LOGGER

The unit can be controlled completely on line monitoring provided.

Now you can monitor your plant from any where in the world with all new web based data logger system. Mobile App can be download from www.manikengineers.com

For demo log on to:

<http://202.149.193.118:8080/mlogger1.1/>

User Name **maniks2**

Password **datalogger2**

MULTI CHANNEL TEMPERATURE INDICATOR

MANIK Engineers has a wide range of products to monitor Temperature, Pressure in any air conditioning / refrigeration plant.

Input Sensors : RTD Pt 100 or
Pt 1000 Pressure
Transmitter (420 mA)

Display : 3 1/2" Digit.
Supply : standard 230 AC Optional
110VAC/
24 VAC/DC

Out Put : Potential free change over contacts for
230 VAC, 10A max. resistive load optional.



MULTI POINT ALARM ANNUNCIATORS



MICROWATCH ANNUNCIATOR

The Microwatch ASO is specially designed for tripping of plants such as refrigeration / air conditioning compressors, chillers etc.

In such plants each & every fault is important and has to trip the compressor. The unique design has two relays, one for hooter operation & other for ALL SAFETY OK (ASO) contact, which is to be used in series with compressor starter circuit.

This eliminates the use of conventional multiple contractor, Relay logic for tripping of compressor.

The Microwatch accepts potential free contacts as inputs with a selectable facility for **"Make to Alarm"** (NO Type) & **"Break to Alarm"** (NC type), for each individual inputs. Preprogrammed time delays can be provided for individual windows for fault such as Low Differential Oil Pressure (OP) or Low Oil Level etc.

COLD ROOM ALARM



COLD ROOM ALARM kit:

Consisting of control unit with acoustic-visual warning. It comes complete with buffer battery and luminous emergency in-room pushbutton.

APPLICATIONS:

"Man in room" safety system for low temp. rooms.

SYSTEM DESCRIPTION:

The COLD ROOM ALARM kit allows a person trapped inside the cold room to activate an acoustic-luminous alarm installed outside the room and so call for help. The system will work even in the event of a temporary power cut thanks to the buffer battery on the external unit.

The Cold Room Alarm Unit is available in 3 different models 4, 8 or 16 Input. The 4 input unit can be used for 4 cold rooms, 8 input unit for 8 rooms and 16 input unit for 16 rooms. Thus giving the flexibility and low cost.

ICE THICKNESS CONTROLLER



Electronic Controller Type ITC is an equipment for automatically controlling the thickness of ice around the chilling tubes in Ice Bank systems. This unit provides an ON/OFF control.

When ice is formed around the chilling tube to the required thickness, it

automatically cuts off the electric supply to the compressor or Solenoid valve.

The compressor/Solenoid valve is automatically cut-in after 6 mm of melt down of ice.

The electronic controller along with a sensor probe assembly forms the complete unit.

DIGITAL TEMPERATURE INDICATORS / ON-OFF CONTROLLERS



TDI 1R01 : 96 x 48 x 100



TDI 1R01 : 96 x 96 x 150



TDI 1R01-W : 170 x 230 x 85



TDI 1R01-W : 125 x 125 x 75



TDI 1R02 : 96 x 96 x 150



TDI 2R02 : 96 x 96 x 150



TDI 2R02-W : 125 x 230 x 100



TDI 1R01-FLP



TDI 1R01-1 : 96 x 138 x 100



TDI 1R01-1-1W : 125 x 200 x 80



TDI 1R01-2 IP65 : 250 x 160 x 110



TDI 1R01-2 W : 330 x 230 x 105



TDI 1R01-Gauge : 125 x 125 x 75



TDI 1R01-4-W : 510 x 300 x 120



TDI 4R04-W : 220 x 230 x 105



TDI 6R06 : 202 x 152 x 200



TIC 1R01 : 96 x 96 x 150



TIC 1R01-W : 125 x 230 x 100



TIC 1R02 : 96 x 96 x 150



TIC 1R03 : 96 x 96 x 150



TIC 1R04 : 96 x 96 x 150



TIC 1R05 : 96 x 96 x 150



TIC 1R04 : 96 x 138 x 200



TIC 2R02 : 96 x 96 x 150

Dimensions in mm : H x W x L

HAND HELD DIGITAL THERMOMETER / BATTERY OPERATED TEMPERATURE INDICATORS

In response to today's ever-increasing demand for speed, accuracy and performance at an affordable price, MANIK Engineers has introduced the hand-held digital thermometers.

The MANIK Hand Held Digital 2000 Series provides precise, stable readings, even in demanding environments. They are simple to operate, fast, reliable and built to last. Some measurements take minutes using standard thermometers due to poor thermal conductivity in the item being measured. Often a highly accurate answer is not required and an indicative answer showing that the reading is above or below a desired threshold will suffice.

KEY FEATURES:

On/off switch on front side.

Operates on easily available standard 9V battery cell.

Available for any RTD Pt-100, Pt-1000

Single instrument to read temperature with various installed RTD

Speed Read for quicker indicative readings

Robust case for long life in harsh environments



MICROCONTROLLER BASED MULTI FUNCTION TEMPERATURE CONTROLLERS TYPE MTIC



MANIK Engineers has introduced new series of Microcontroller based controllers. The new range of MTIC has many additional features, however, packed in same enclosure. Hence can be used to replace existing TIC range of Controllers

Standard DIN Enclosure 96 X 96 X 150 mm

Simple to use key board

Dual 7 Segment LED Display

Multiple Set Point options e.g.

Single, Two, Three, Four, Five

Range - 100°C to +200°C, Resolution 0.1°C, Accuracy $\pm 0.2^\circ\text{C}$

- Hysteresis (Neutral Zone) adjustable 0.1°C to 10°C
- Calibration Adjustable $\pm 20^\circ\text{C}$
- Relay output
- Optional Time delay for Relay Output
- Optional RS232 / RS485 port for communication
- Optional available Software for PC monitoring

DIGITAL GAS INDICATORS & INDICATING CONTROLLERS



In response to today's ever-increasing demand for speed, accuracy and performance MANIK Engineers has introduced the Digital Gas Indicators & Indicating Controllers for Cold Chain Solutions.

The MANIK Digital Gas Indicators & Indicating Controllers Series provides precise, stable readings, even in demanding environments. They are simple to operate, fast, reliable & built to last. Today's cold chain requires not only the temperature and humidity measurement but also percentage of gas for Ethylene, Carbon Dioxide, Oxygen & Nitrogen.

KEY FEATURES:

- Standard Enclosure for panel and wall mounting application
- Operates on 230VAC, 50Hz, with inbuilt power supply for gas transmitters
- Available for gases such as Ethylene, Carbon Dioxide, Oxygen & Nitrogen.
- Robust case for long life in harsh environments

DIGITAL TEMPERATURE + RELATIVE HUMIDITY INDICATORS AND INDICATORS CONTROLLERS



- Combined measurement of Temperature & Relative Humidity.
- Simultaneous display of both Parameters Temperature & Relative Humidity.
- Various option are available.
- Temperature + Relative Humidity Indicator.
- Temperature Indicating Controller + Relative Humidity Indicator.
- Temperature Indicator + Relative Humidity Indicator Controller
- Temperature Indicating Controller + Relative Humidity Indicator Controller
- Inbuilt power supply for Temperature + Humidity Transmitter
- Accuracy can be up to 1.5% for Relative Humidity & 0.5% for Temperature
- Humidity Range 0% to 100%.
- Temperature Range -40°C to 80°C
- Fast response

DIGITAL PRESSURE INDICATORS AND INDICATORS CONTROLLERS



Industrial Electronic Instrumentation aims at measurement and control of process variables at maximum efficiency and minimum cost. Many times process parameters are located at remote distances and needs to be monitored / controlled at single point. In today's environment monitoring pressure has

become important criteria. Particularly in Refrigeration industry pressure measurement is very important as complete refrigeration cycle is based on pressure temperature relation of refrigerant. Accurate pressure measurement is the key factor in deciding system capacity & power consumption. Gone are the days when you have to depend are analog pressure gauges with low resolution, error of parallax. Now we need faster, more accurate and on line measurement. "MANIK" make Digital Pressure Indicator/ Indicating Controllers are designed to serve to today's automation requirements

SALIENT FEATURES:

- Precise measurement of pressure with resolution of 0.01 bar.
- Various options are available
- Pressure Indicator
- Pressure Indicating Controller Indicator Single and Multiset Point
- Differential Pressure Indicator and Indicating Controller
- Inbuilt power supply for Pressure Transmitter
- Accuracy can be up to $\pm 0.25\%$
- Input 4 to 20 mA or 0 to 5 VDC or 1 to 5 VDC
- Fast response

APPLICATIONS:

- Quality Control Laboratories
- Green Houses
- Refrigeration Plants Etc.
- Fisheries, meat-processing plants etc.
- Pharmaceuticals
- Testing Chambers
- Cold Storage
- Weather stations

ELECTRONIC TEMPERATURE SENSORS



TEMPERATURE SENSOR

Pt100, Pt1000 are available for various applications such as special design for cold storage. Pencil type for external tube fitment, or standard immersion type with thermowells. Thermowells are available with SS304, or SS316 material 1/2", 3/4" Process connection or flange type.

ELECTRONIC HUMIDITY SENSORS AND TRANSMITTERS TYPE FKH -140, FKH-240, FKH-240C

Compact enclosure I.P 65.
Resistant to volatile organic compounds.
Highly stable.
Accuracy + 2%
Humidity span 0% to 100%.
DC operation
Temperature compensated
Fast response



GAS SENSORS / TRANSMITTERS



Today's cold chain requires percentage of gas for Ethylene, Carbon Dioxide, Oxygen & Nitrogen.

MANIK Engineers offers rugged sensors to measure these gases.

All the sensors work on 24VDC Supply.

The output is 4 to 20mA

Enclosures are available in two options

- 1) Standard IP 65 for cold room
- 2) Sensors are available in flame proof enclosure on request

CO₂ PORTABLE HANDHELD DEVICE



- State-of-the-art non-dispersive infrared (NDIR) technology to measure carbon dioxide gas in parts-per-million (ppm)
- Data output RS232 (optional)
- Displays the current carbon dioxide temperature on a large LCD
- Displays TWA (8hours) STEL (15 minutes) Min, Max and average values
- Internal automatic self-diagnostic function
- Audible alarm, Easy to calibrate
- Measurement Range : 0 - 2000 ppm
- Measurement Temperature : 0°C - +50°C

PRESSURE TRANSMITTERS



Resistant to Pressure peaks
Shockproof- and vibration-proof
Insensitive to temperature shocks
Protection system IP 65 according to DIN
Parts and casing with contact to measuring
Material of Cr-Ni steel

AMMONIA GAS LEAK DETECTOR / LCD



- Microprocessor controlled device
- Customized calibration optional possible
- Display of the calibrated gas concentration Values

from 1 ppm up to 2000 ppm (Optional 1 up to 1000 ppm Automatic measuring range change over)

- Various optional Accessories, variable acoustic signal depending on concentration (can be switched OFF), automatic zero setting on air after switch ON.

INDUSTRIAL SOLENOID VALVES TYPE WB SERIES



FOR AIR, WATER, BRINE, STEAM AND LIGHT OIL

These valves are suitable for most types of industrial applications. Ideal for water, light oil, airline to chucking devices, brine, pilot valve to pneumatic controls, low pressure steam. Available from 1/8" port size to 2" with piston operation and stainless steel insert seat.

FLOW SWITCH TYPE FS - 100 E


















The FS-100 offers accurate flow detection, with 1% repeatability, over a broad range of flow settings. Its durable construction delivers long-life reliability in either water or oil. Generous flow paths keep pressure drop low. These switches are ideal for detection of improper flow rates in high volume lubrication, cooling or process systems.

FS-100 Adjustable Series switches offer the same accuracy and are as rugged as those with fixed settings, but provide one additional feature: **external adjustability.**

With these versatile switches your choice of flow settings is diverse within a given range. An ordinary, flat-blade screwdriver is all that's required for the actuation adjustment.



COMPRESSOR CAPACITY CONTROL SOLENOID VALVES

Photo	Model Number	Compressor / Company
	MCC-1	Bock
	MCC-6 BK 33	Bock Old Kirloskar FK & GK Kirloskar
	MCC-2	Frick / Eclipse Mycomp
	SVRF 104 SVRF 106 SVRF 108 SVRF 116	Sabroe SMC
	MCC 4 - NC MCC 5 - NO	CSI Screw NC & NO type
	MCC 7 - A	Carrier Carlyle
	MCC 14 - A	Carrier Carlyle
	MCC 8 - B	Blue Star / York
	MCC 9	As per Sample
	MCC 10 - SCVH + NC	Howden Screw NC
	MCC 11 - SCVH + NO	Howden Screw NO
	MB-36 SVRF	Mycomp M L K N series compressor
	MCC 12	Bitzer, Comer
	MCC 13	Bitzer, Comer, Hanbell etc.
	MCC 3	Mc Quay
	SMO	Sabroe CMO
	MCC 15	Refcomp
	MCC 16	Emerson

COILS FOR SOLENOID VALVES AND LEVEL CONTROLLER

COIL TYPE	PHOTO	SUITABLE FOR FOLLOWING VALVES
SOLENOID COIL - KC-3		SA5A3, SA17A3, SA12P3, SA42P3
SOLENOID COIL - MKC-3-1 MOULDED - MKC-3-2		SA5A3, SA17A3-MKC-3-1 SA32P3, SA42P3, SA50P3-MKC3-2 Suitable for MOPD I 150 PSI only
COIL MOULDED - MKC-3-3		SA5A3, SA17A3, SA12P3, SA42P3
MSVRA		SPM1, SPM3, SPML, SPMLX, SVM-NC, SVM-NO, SVRA, SVRF, CAPACITY CONTROL
SOLENOID COIL SVRA GP		SPM1, SPM3, SPML, SPMLX, SVM-NC, SVM-NO, SVRA, SVRF, CAPACITY CONTROL
SVRA GP COIL FOR FLAMEPROOF HOUSING		SPM1, SPM3, SPML, SPMLX, SVM-NC, SVM-NO, SVRA, SVRF, CAPACITY CONTROL
SOLENOID COIL - HKC-1		MS7A, MS8A, MSA4A
SOLENOID COIL - MKC-2		WB SERIES, E SERIES, MB SERIES
SOLENOID COIL - MKC-4		PARKER VALVES
SOLENOID COIL - SMK 1		WB SERIES, E SERIES MB SERIES, ALCO CAPACITY CONTROL
SOLENOID COIL - MKC 1		WB SERIES, E SERIES, MB SERIES
SOLENOID COIL - BK 33		CAPACITY CONTROL BK-33
FLOAT COIL - FC 1		LEVEL CONTROLLER LC 101 AI
FLOAT COIL - FC 2		LEVEL CONTROLLER 39F, 39FI
FLOAT COIL - FC 2-1		LEVEL CONTROLLER 39F, 39FI
MVC - 1		VILTER COMPRESSOR

MANIK MCC Series Compressor Capacity Control Solenoid Valves MCC series compressor cylinder end unloading solenoid valves are a kind of capacity adjusting valves developed as per requirements of OEM Compressor Manufacturers. They are generally mounted on the cylinder lid of refrigeration compressor or on the body of the compressor.

THERMOSTATIC EXPANSION VALVE



The Thermostatic Expansion Valve (TEV) controls the flow of liquid refrigerant entering the direct expansion (DX) evaporators maintaining a constant super heat of the refrigerant vapour at the outlet of the evaporator.

Type SVE2,3,4,5,8,10 are external equaliser with solder connections.

Type HVE 7,11,16,20, MVE21,34,42 VVE52,70,100 are external equaliser with weldable flange connection.

Various ranges of the power assemblies are available from +20°C to -40°C

SOLENOID VALVES FOR FLUORINATED REFRIGERANTS



E series is a direct or pilot operated Solenoid Valve. These valves can be supplied with either Flanged type, Solder, or male / female pipe thread type connections. The problem of the integral body material seats in Solenoid Valves getting deteriorated very rapidly is eliminated by using stainless seat insert in place of usual body material.

These valves are suitable for all fluorinated refrigerants such as R22, R502, R134A, R404A etc.

DISCHARGE GAS BYPASS VALVE



Discharge Bypass Valve is used to bypass a portion of the hot discharge gas directly into the low side to limit the minimum evaporating pressure during periods of low load either to prevent coil icing or to avoid operating the compressor at a lower suction pressure than it was designed to operate. This valve, which opens on a decrease in suction pressure, can be set to automatically maintain a desired minimum evaporating pressure regardless of the decrease in evaporator load.

SUCTION ACCUMULATORS

Suction Accumulators feature an inlet deflector that bends refrigerant flow to prevent internal splashing and facilitates the collection of refrigerant oil in the bottom connection of the accumulator



Available in 3-5 TR, 5-7 TR, 7-10 TR Models.

DESUPERHEATER



'Tube-in-Tube' type 'counter flow' heat exchanger gives 3% to 5% Power saving of Compressor motor. Free hot water for

- Boiler make-up water
- Heating of reactors & autoclaves
- Hot water supply for guest rooms in hotels
- Washing & Cleaning
- Dehumidifiers

Advantages

Large saving in fuel & electricity bills.

Reduced load on condenser results in possible saving of electricity for condenser pump & cooling tower fan.

Eliminates Scaling of Condenser

Zero Maintenance

HEAT RECOVERY SYSTEM

HEAT PIPE HEAT EXCHANGER FOR ENERGY CONSERVATION

Converts hot to cold and cold to hot. Can be used for air, water, liquid and gases medium.

Operating temperature 0°C to 600°C

Unique individual pipes which are easy to maintain / service

Heat Pipes for Heat Recovery

Utilizing a heat pipe, thermal energy can be recovered from warmer air and added to cooler air.

In temperate climates this permits energy saving to be realized through preheating of the outside air. Conversely, in hot climates the savings are associated with pre-cooling of the outside air.



ECONET ADIABATIC COOLING SYSTEM



INTRODUCTION

ECONET concept is based on intermittently and efficiently evaporating water on a large area in front of the heat rejection surface of Mini - Split, Rooftop, Air Cooled Chillers, Condensers and Dry Coolers.

FEATURES

Water Spray System, Quick change type plastic nozzles connected in series or parallel arrangement in order to provide uniform coverage area for an effective evaporation process. Nozzles are designed to operate with very low pressure and they can operate with normal city mains water pressure 1.5 bar g (21 psi g) / (15m) and above.

ECONET

Non metallic mesh provides an effective coverage area for an efficient evaporation surface with minimal air pressure drop Meshes are fixed in front of the heat rejection surface via spacer bars and / or fixing brackets to suit the unit configuration. Various size sectional mesh panels are either joined together to form a full mesh area or alternatively flexible mesh roll cut to fit to a required size in front of the heat rejection surface. This design provides easy maintenance and replacement for the mesh panels.



Manik Engineers manufacturing controls, control valves for automation of refrigeration plant since 1978, is truly following the dream of Honorable Prime-Minister Narendra Modi, Make in India. We are Made India since 1978. Our products include Ammonia solenoid valves, Liquid level controller, Float Switches, Pressure / Temperature Regulating Valves, In Line Check (Non Return) Valves, Safety Valves, Hot Gas Defrosting system for gravity and pump recirculation plants, Screw & Piston Compressor Capacity Controller, temperature, pressure, relative humidity, carbon dioxide & ethylene sensors, transmitter, indicators, controller.

We manufacture dataloggers, web based monitoring solutions, centralized plant monitoring system and mobile based application to provides latest monitoring & recording system.

Our centralized Ammonia Leak detection system helps for safe plant operation.

Our unique energy saving products are automatic air purgers, water removal system, heat recovery system for air to air, desuperheaters to generate free hot water from your refrigeration plant & adiabatic condenser energy saving system.

These controls provide precise automation of plant monitoring, control, hot gas defrost system. Our customers have achieved tremendous energy savings and safe plant operations.

The products are very popular in Beverages and Breweries, Cold Storages Pharmaceuticals, Chemical, Bulk Drug, Dyes and Intermediates Industry, Dairy, Food Industry, Staple Fiber, Nylon and Textile Industry.

The OEMs such as Johnson Controls, York, Kirloskar Pneumatics, Alfa Laval, Frick, Sabroe, Mycom, IDMC (Indian Dairy Machinery Company), Cooling People, Voltas, ACR Engineering, Systems & Components etc. have standardised our controls for past decades.

The products have been approved by National Dairy Development Board, the Govt. of India unit responsible for making India largest producer of milk in world.

The MNC's, Indian as well as foreign such as Ranbaxy Laboratories, Lupin Laboratories, Ajanta Pharma, Colourchem India, Max India, Orchid Chemicals, Cipla, Workhardt, Shasun Chemicals, Spic Chemicals, Rallies Group, Max GB, Ciba Giegy, Clariant India, Ciba Specialties, Novartis, Hoechst, Nestle, Hindustan Lever, Smith Kline Beecham, Cadburys India, CocaCola India, Pepsico Holdings India, United Breweries, Mysore Breweries, Foster India are few of our satisfied customers for past 39 years.



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