



Exploration & Production

GENERAL SPECIFICATION

HVAC

GS HVA 803

Symbols for P&ID and D&ID
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00	11/03	First issue
Rev.	Date	Notes



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1. Scope

The present specification defines the COMPANY requirements for drawing normalisation of HVAC documents.

2. Reference documents

The reference documents listed below form an integral part of this General Specification. Unless otherwise stipulated, the applicable version of these documents, including relevant appendices and supplements, is the latest revision published at the EFFECTIVE DATE of the CONTRACT.

Standards

Reference	Title
Not applicable	

Professional Documents

Reference	Title
Not applicable	

Regulations

Reference	Title
Not applicable	

Codes

Reference	Title
Not applicable	

Other documents

Reference	Title
Not applicable	

Total General Specifications

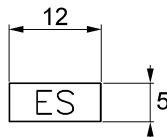
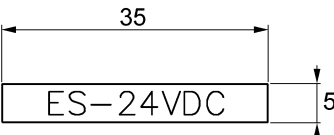
Reference	Title
Not applicable	

3. Symbols for instrument diagrams (P&ID and D&ID)

3.1 Connections definitions

3.1.1 Instrumentation

Definition		Colour	Line name
Instrument or equipment supply or connection to process	ES SEE "Supply type" detail	132	Continuous
Capillary link	— X — X — X — X — X —	132	Capillary tube
Electric analogic signal	— — — — — — — —	132	Cache
Electric binary signal	— / — / — / — / — / — / — /	132	Electric binary signal
Pneumatic analogic signal	— // — // — // — // — // — // — //	132	Pneumatic analogic signal
Pneumatic binary signal	— //X — //X — //X — //X —	132	Pneumatic binary signal
Hydraulic signal	— ⊥ — ⊥ — ⊥ — ⊥ — ⊥ — ⊥ —	132	Hydraulic signal
Binary link system link (software or data link)	— ○ — — — — — — — —	132	Binary link system
Undefined signal	— / — / — / — / — / — / — /	132	Undefined signal
Mechanical link	— — — — — — — —	132	Mechanical link

“Supply type” detail	
The following abbreviations must be indicated to denote type of supply:	
AS: Air Supply ES: Electrical Supply GS: Gas Supply HS: Hydraulic Supply IAS: Instrument Air Supply PAS: Plant Air Supply NS: Nitrogen Supply SS: Steam Supply WS: Water Supply	Square shape sizes: 
The supply level may be added to the supply line, e.g. 100 psig, 24 VDC:	

3.1.2 Ducting

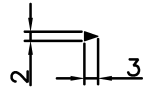
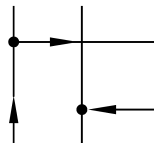
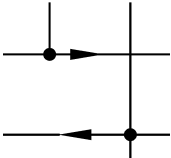
Definition		Colour	Line name
Blowing duct (normal)	— . — . — . —	134	Blowing normal
Blowing duct (emergency)	— . . — . . —	134	Blowing emergency
Blowing duct (to kitchen hood)	— + — + —	134	Blowing compensation
Exhaust duct (normal)	— — — . —	134	Exhaust normal
Exhaust duct (emergency)	— — — . . —	134	Exhaust emergency
Exhaust duct (local)	— — — . . . —	134	Exhaust local
Fresh air duct	— — — — —	134	Fresh air
Return air (normal)	— — — . —	134	Return normal
Return air (emergency)	— — — . . —	134	Return emergency

3.1.3 Piping

Definition		Colour	Line name
Chilled water piping	— CW — CW —	162	Chilled water
Hot water piping	— HW — HW —	162	Hot water
Potable water piping	— DW — DW —	151	Potable water
Sea water piping (fouling scavenger/chlorine)	— JW — JW —	162	Sea water CHL
Utility water piping	— UW — UW —	20	Utility water
Dirty water drain	— WD — WD —	40	Dirty drain
Instrument air	— IA — IA —	130	Instrument air
Refrigerant piping	— R — R —	56	Refrigerant
Lubrication piping	— LUB — LUB —	180	Lubrication

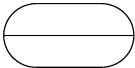
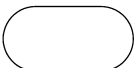
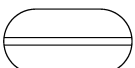
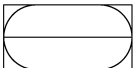
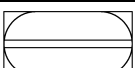
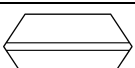
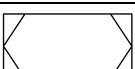
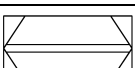
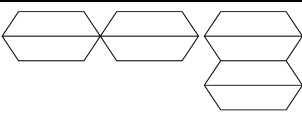
3.1.4 Miscellaneous

Definition		Colour	Line name
Unit limit	_____	131	Unit limit
HVAC equipment (normal)	_____	150	Continuous
HVAC equipment (emergency)	_____	240	Continuous

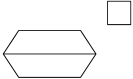
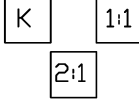
Direction of flow or of signal can be indicated to avoid confusion	
Branch distribution	
Riser distribution	

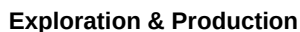
3.2 Instrument definition

3.2.1 Instrument type

Instrument type	Definition	Symbol	Symbol name (library)
Discrete instrument	Instrument installed inside control room		I1
	Instrument field mounted		I2
	Auxiliary location		I3
Share display, shared control	Instrument installed inside control room		I4
	Instrument field mounted		I5
	Auxiliary location		I6
Computer function	Instrument installed inside control room		I7
	Instrument field mounted		I8
	Auxiliary location		I9
Programmable logic control	Instrument installed inside control room		I10
	Instrument field mounted		I11
	Auxiliary location		I12
Available for every instrument	Instrument sharing common housing		

3.2.2 “Block function” symbol list

Function	Definition	Symbol	Symbol name (library)
	Function “Block-Function” : Associated with controllers, computing devices, converters, relays.		
Summing	The output equals the algebraic sum of the inputs (the inputs may be labelled with positive or negative signs)		I30
Averaging	The output equals the algebraic sum of the inputs divided by the quantity of inputs		I31
Difference	The output equals the algebraic difference of the inputs		I32
Proportional	The output is directly proportional to the input, in case of a volume booster, “k” may be replaced by 1:1, for fixed gains, 2:1, 3:1 etc. may be substituted for K;		I33
Integral	The output varies in accordance with both magnitude and duration of the input. The output is proportional to the time integral of the inputs		I34
Derivative	The output is proportional to the rate of change (derivative) of the input		I35
Multiplying	The output equals the product of the inputs		I36
Dividing	The output equals the quotient of the two inputs		I37
Root extraction	The output equals the root (i.e., cube root, fourth root, 3/2 root, etc.) of the input; If n is omitted, a square root is assumed		I38
Exponential	The output equals the input raised to a power (i.e. second, third, fourth, etc.)		I39
Non linear or non specified function	The output equals some non linear or unspecified function of the input		I40
Time function	The output equals the input times some function of time or equals some function of time alone		I41
High selecting	The output is equal to the greater of the inputs		I42
Low selecting	The output is equal to the lesser of the inputs		I43
High limiting	The output equals the input of the high limit value whichever is lower		I44
Low limiting	The output equals the input of the low limit value whichever is higher		I45
Reverse proportional	The output is reversely proportional to the input		I46
Velocity limiter	The output equals the input as long as the rate of change of the input does not exceed a limit value. The output will change at the rate established by this limit until the output again equals the input		I47



General Specification

Date: 09/03

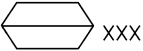
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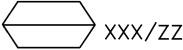
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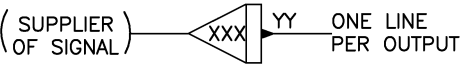
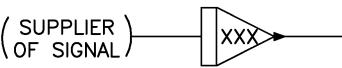
Note 1 : Status at inputs (0 or 1) of interlocking must be indicated, to obtain status (0 or 1) indicated at output.

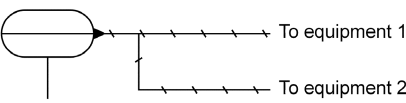
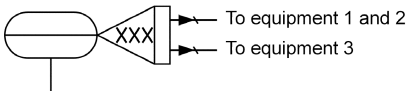
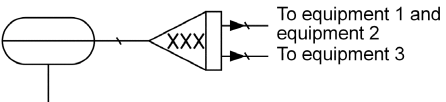
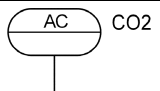
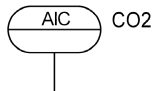
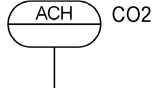
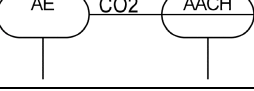
Symbols complementary information	
WW/WW SSS	SSS: Indication of status: 1: On 2: Off 4: Absence of fault 8: Fault Indication is sum of the above used status. WW: Type of display (combination of one or several item(s)): - LED: Led - VDU: Video Display Unit - ANP: Annunciator panel - PRN: Printer - IND: Indicator of value - SYN: Synthesis LED

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Complementary information for sensors and/or controllers (optional)	
	Complementary information used only when signal is sent to PLC (combination of items when necessary): XXX value defines level of signal which lead an action on equipment. XXX values: H: Action when High level of signal L: Action when Low level of signal AL: Alarm when level of signal is Low AH: Alarm when level of signal is High When action to equipment other than PLC, line must be drawn from instrument to equipment.

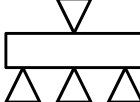
Complementary information for sensors, switches, controllers (optional)	
	XXX: see "Complementary information for sensors and/or controllers" (above paragraph). In case of switch "XXX" is not used but "/" must be maintained. ZZ value defines action on final equipment receiving the command. ZZ values: H: Lead "On" of equipment L: Lead "Off" of equipment DE: Signal decrease IN: Signal increase

Symbols list attached to connection lines		
Designation	Symbol	Symbol name (library)
Purge or flushing device		I13
Reset for latch type actuator		I14
Undefined interlock logic (note 1)		I15
Interlocking "And" function (note 1)		I16
Interlocking "Or" function (note 1)		I17
Logic output 		I50
Logic input 		I51
XXX: type of logic controller : HVA: HVAC logic controller F&G: Fire & Gas System PCS: Process Control System PSS: Process Safety System SSS: Safety Shutdown System		YY: signal using : H: Action when High level L: Action when Low level AL: Alarm when Low level AH: Alarm when High level IN: Increase the signal DE: Decrease the signal

	Signal from controller to equipment 1 and to equipment 2 is issued from a common output. Symbol  is optional when only one output
	Controller has two outputs. One is sent to equipment 1 and 2. A second output is sent to equipment 3.
	Controller has only one output. Signal from controller is relayed. (Symbol  is not attached to instrument) One relay contact is sent to equipment 1 and to equipment 2. A second relay contact is sent to equipment 3.
	CO₂ analyser with result indicator. Analyser located in field.
	CO₂ analyser with indicator and control. Analyser located in field.
	CO₂ analyser. Controller output activated when CO₂ high level. Analyser located in field.
	CO₂ analyser. Controller supplies alarm when CO₂ high level. Sensor and controller in common housing. Analyser located in field.
	CO₂ analyser. Controller supplies action when CO₂ high level. Sensor and controller in separated housing. Sensor in field, analyser in control room.
	Thermostat. Action when temperature decreases. Located in field.
	Thermostat. Alarm when temperature decreases. Located in field.

4. Symbols for piping diagrams

4.1 Manual valves

Definition	Symbol	Symbol name (library)
General valve open at normal operation		RB1
General valve closed at normal operation		RB2
Globe valve open at normal operation		RB3
Globe valve closed at normal operation		RB4
Ball valve open at normal operation		RB5
Ball valve closed at normal operation		RB6
Three-way valve		RB7
Butterfly valve open at normal operation		RB8
Butterfly valve closed at normal operation		RB9
Four-way valve		RB10
Pressure reducing valve		RB11
Balancing valve with variable orifice or regulating valve + fixed orifice		RB12
STAP: ΔP control valve		RB13
Shut off valve with separate adjustable Kv. Double regulating valve		RB14
Balancing valve driven by fluid		RB15

4.2 Check valves

Definition	Symbol	Symbol name (library)
General check valve		RB21
Lift check valve		RB22
Angle check valve		RB23
Swing check valve		RB24

4.3 Filters

Definition	Symbol	Symbol name (library)
Strainer filters "T"		RB30
Strainer filters "Y"		RB31

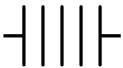
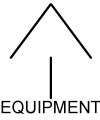
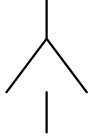
4.4 Valves / fittings with safety functions

Definition	Symbol	Symbol name (library)
Safety valve		RB40
Bursting disk (curvature is on outlet side)		RB41
Relief valve BPV		RB42

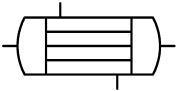
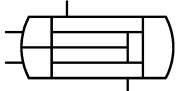
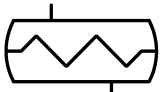
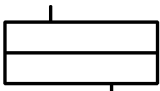
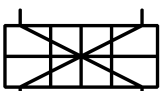
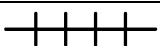
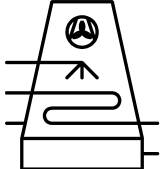
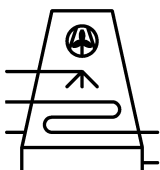
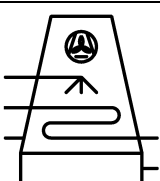
4.5 Actuators

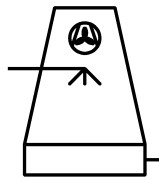
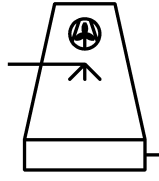
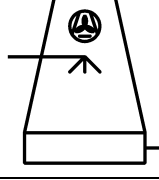
Definition	Symbol	Symbol name (library)
Electric motor drive		RB50
Electric motor drive open in case of failure of actuating energy		RB51
Electric motor drive closed in case of failure of actuating energy		RB52
Electric motor drive blocked in case of failure of actuating energy		RB53
Solenoid drive		RB54
Solenoid drive open in case of failure of actuating energy		RB55
Solenoid drive closed in case of failure of actuating energy		RB56
Piston drive		RB57
Piston drive open in case of failure of actuating energy		RB58
Piston drive closed in case of failure of actuating energy		RB59
Floating drive		RB60
Opening at rising level		RB61
Opening at failing level		RB62

4.6 Piping accessories

Definition	Symbol	Symbol name (library)
Piping compensation		RB80
Reducing		RB81
Flanges		RB82
Sight glass		RB83
Sight glass with humidity indicator		RB84
Muffler		RB85
Orifice plate		RB86
Steam trap		RB87
Funnel		RB88
Venting device		RB89
Venting device to outside of building		RB90

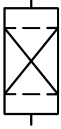
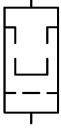
4.7 Exchangers

Definition	Symbol	Symbol name (library)
Tube bundle heat exchanger shell and tube		EQ1
Floating head tube bundle heat exchanger		EQ2
Heat exchanger with tube coil		EQ3
Double pipe heat exchanger		EQ4
Plate type heat exchanger		EQ5
Finned coil heat exchanged		EQ6
Spray		EQ7
Tube coil heat exchanger		EQ8
Evaporative fluid cooler		EQ9
Evaporative fluid cooler with axial fan		EQ10
Evaporative fluid cooler with centrifugal fan		EQ11

Definition	Symbol	Symbol name (library)
Evaporative fluid cooler		EQ13
Evaporative fluid cooler with axial fan		EQ14
Evaporative fluid cooler with centrifugal fan		EQ15

5. Symbols for refrigerating systems diagrams

5.1 Refrigerating piping accessories

Definition	Symbol	Symbol name (library)
Fixed bed filter		RB100
Cartridge filter		RB101

6. Rotating equipment

6.1 Refrigerating compressors

Definition	Symbol	Symbol name (library)
Reciprocating compression		RB110
Rotary piston compressor		RB111
Turbo compressor		RB112
Scroll compressor		RB113
Roller vane compressor		RB114
Screw compressor		RB115

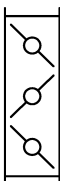
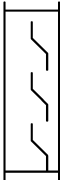
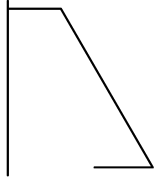
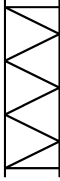
6.2 Pumps

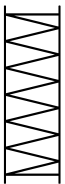
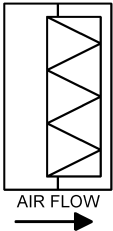
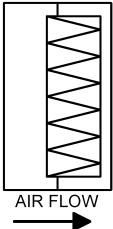
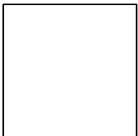
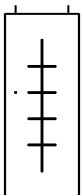
Definition	Symbol	Symbol name (library)
Centrifugal pump		RB120
Valve speed pump		RB121

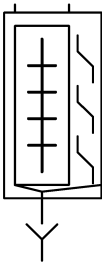
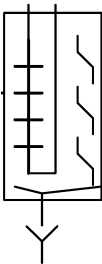
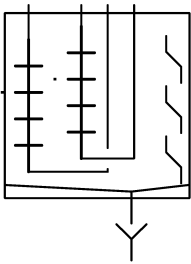
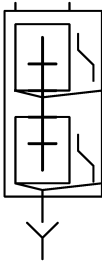
6.3 Driving motors

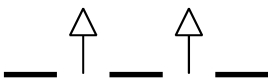
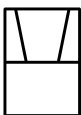
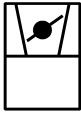
Definition	Symbol	Symbol name (library)
Electric motor drive		RB70
Electric motor drive 1 phase - VAC		RB71
Electric motor drive 3 phases - VAC		RB72
Electric motor drive DC		RB73

7. Symbols for ventilation and duct diagrams

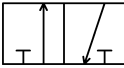
Definition	Symbol	Symbol name (library)
Back draft damper		V1
Shut-off damper Balancing damper		V2
Fire damper		V3
Bird screen		V4
Louvre		V5
Goose neck or 90° elbow		V6
Air transfert grille		V7
Pre-filter		V8

Definition	Symbol	Symbol name (library)
Filter		V9
Pre-filter installed inside casing (mounting on frame)		V10
Filter installed inside casing (mounting on frame)		V11
Casing		V12
Casing		V13
Casing equipped with condensate drain		V14
Heating coil (finned tube)		V15

Definition	Symbol	Symbol name (library)
Cooling coil with droplet separator and condensate drain		V16
Direct expansion coil with droplet separator and condensate drain		V17
Two imbricated direct expansion coils with droplet separator and condensate drain		V18
Cooling coil with droplet separator and double condensate drain		V19
Fan		V20
Centrifugal fan		V21
Axial fan		V22
Orifice for measurement (one for temperature, one for relative humidity, one for pitot)		V23

Definition	Symbol	Symbol name (library)
Return air grille		V24
Air diffuser (rectangular, circular, square)		V25
False floor grille (perforated grille)		V26
Duct heater		V27
Flexible duct		V28
Sound attenuator		V29
Constant volume box with duct heater		V30
Constant volume box		V31
Variable volume box including heater		V32
Variable volume box		V33
Heater		V34
Blast resistant damper		V35
Perforated grille for balancing		V36

8. Symbols for pneumatic diagrams

Definition	Symbol	Symbol name (library)
Distributor 3/2		RB1
Pressure regulator		RB1