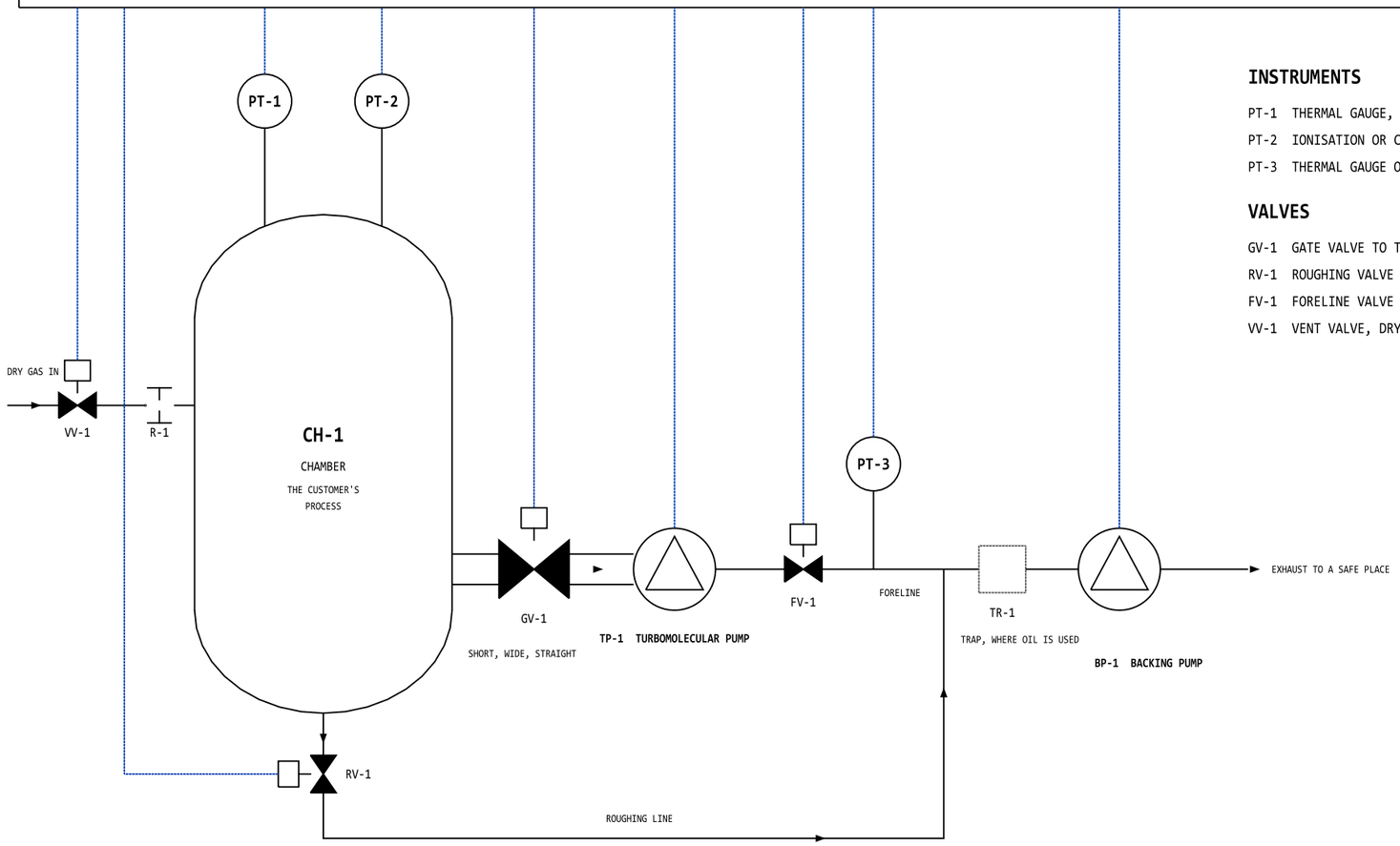
LCP-1 PUMPING STATION CONTROLLER

PUMP START AND STOP - VALVE SEQUENCE - GAUGE PERMITS - VENT - POWER-FAIL SAFE STATE - PUMP-DOWN ON RECORD



INSTRUMENTS

PT-1 THERMAL GAUGE, ROUGH RANGE

PT-2 IONISATION OR COLD-CATHODE GAUGE, HIGH RANGE

PT-3 THERMAL GAUGE ON THE FORELINE

VALVES

GV-1 GATE VALVE TO THE CHAMBER

RV-1 ROUGHING VALVE

FV-1 FORELINE VALVE

VV-1 VENT VALVE, DRY GAS

NOTES

1. REFERENCE SCHEMATIC OF A HIGH-VACUUM PUMPING STATION. TAGS ONLY: NO PRESSURE, SPEED, FLOW OR SIZE VALUE IS GIVEN.
2. CH-1 IS THE CUSTOMER'S CHAMBER. THE LINE FROM CH-1 TO TP-1 IS SHORT, WIDE AND STRAIGHT BECAUSE THE PIPE SETS THE SPEED: THE SPEED AT THE CHAMBER IS BELOW BOTH THE SPEED OF THE PUMP AND THE CONDUCTANCE OF THE PIPE.
3. TP-1 IS A TURBOMOLECULAR PUMP AND CANNOT START AGAINST ATMOSPHERE. BP-1 ROUGHS THE CHAMBER THROUGH RV-1, THEN RV-1 CLOSES, TP-1 STARTS ON FV-1, AND GV-1 OPENS WHEN TP-1 IS AT SPEED AND THE PRESSURE PERMITS.
4. BP-1 IS THE BACKING PUMP, DRY OR OIL-SEALED. WHERE OIL IS USED, TR-1 KEEPS OIL VAPOUR FROM DRIFTING BACK TOWARD CH-1. BP-1 HOLDS THE OUTLET OF TP-1 LOW AND DOES THE ROUGHING THROUGH THE SAME JUNCTION.
5. PT-1 IS A THERMAL GAUGE FOR THE ROUGH RANGE AND PT-2 AN IONISATION OR COLD-CATHODE GAUGE FOR THE HIGH RANGE. A COMBINATION GAUGE MAY JOIN THEM. A GAUGE READS DIFFERENTLY FOR DIFFERENT GASES.
6. PT-3 READS THE FORELINE. LCP-1 USES PT-1, PT-2 AND PT-3 TO PERMIT EACH STEP OF THE SEQUENCE.
7. GV-1, RV-1, FV-1 AND VV-1 ARE CLOSED WITHOUT POWER, SO THAT A POWER FAILURE SHUTS THE CHAMBER OFF.
8. VV-1 VENTS CH-1 WITH DRY GAS THROUGH THE RESTRICTOR R-1, SLOWLY, AND NOT UNTIL TP-1 HAS SLOWED AS ITS MAKER STATES.
9. BAKEOUT HEATING AND A PUMP TO HOLD THE VACUUM ARE ADDED FOR ULTRA-HIGH VACUUM ONLY. SEE SHEET 002.
10. PUMPS, VALVES, GAUGES AND FLANGES ARE CATALOGUE ITEMS, BOUGHT IN. FOR REFERENCE SEE ISO 3529-1 AND ISO 2861.

HIGH-VACUUM PUMPING STATION - PROCESS AND INSTRUMENT SCHEMATIC

NOT TO SCALE - TAGS ONLY, NO PROCESS VALUES

LEGEND

CHAMBER

XX-1 INSTRUMENT (TAG)

SHORT, WIDE LINE

VALVE, CLOSED WITHOUT POWER

RESTRICTOR

VACUUM PUMP

PIPE OR HOSE

OIL TRAP, WHERE OIL IS USED

SIGNAL

HOLDS AND RELEASES

CAUSE	EFFECT
POWER LOSS	ALL VALVES CLOSE, CH-1 SHUT OFF
PT-1 CHAMBER NOT ROUGHED	HOLD TP-1 START, GV-1 SHUT
TP-1 BELOW FULL SPEED	HOLD GV-1 SHUT
PT-3 FORELINE PRESSURE HIGH	STOP TP-1, CLOSE GV-1 AND FV-1
BP-1 FAULT	STOP TP-1, CLOSE GV-1 AND FV-1
VENT REQUESTED	TP-1 SLOWS, THEN OPEN VV-1

REFERENCE CONFIGURATION - NOT FOR CONSTRUCTION

NEOMETRIX DEFENCE LIMITED
ENGINEERED IN NOIDA - INDIA

HIGH-VACUUM PUMPING STATION - REFERENCE CONFIGURATION

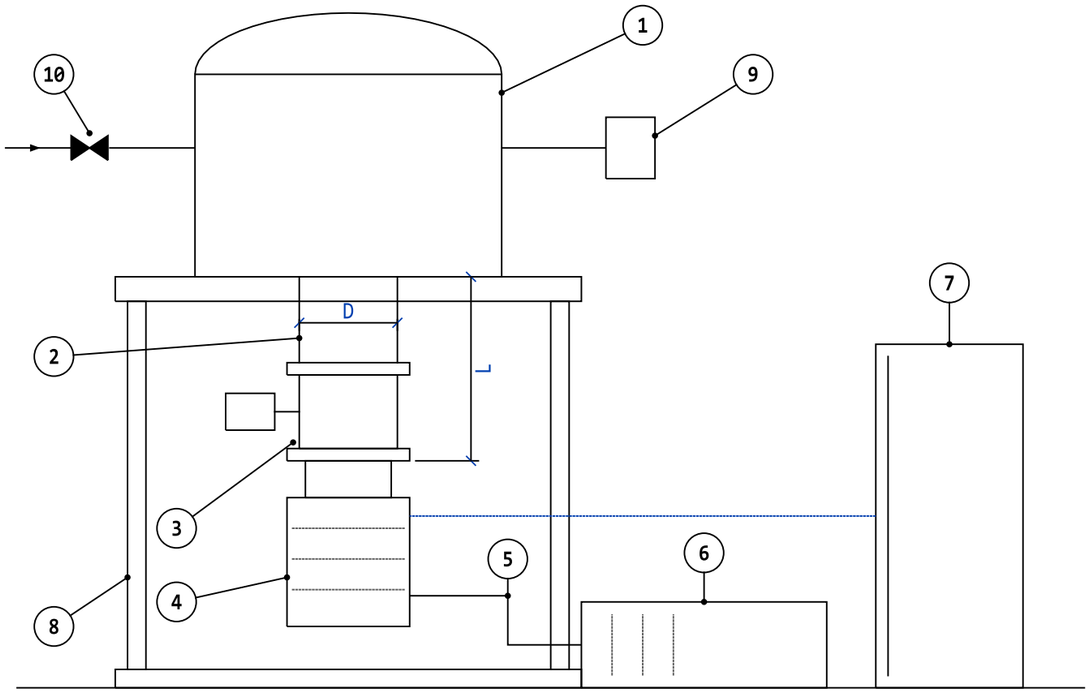
PROCESS AND INSTRUMENT SCHEMATIC

CHAMBER, PUMPS, VALVES, GAUGES, VENT AND CONTROLLER

DWG NO	SCALE @ A3	SHEET	REV
NMX-HVP-89-001	NTS	1 OF 2	A
DATE	UNITS	DRAWN	STATUS
03-11-2026	TAGS ONLY	NMX-DO	REFERENCE

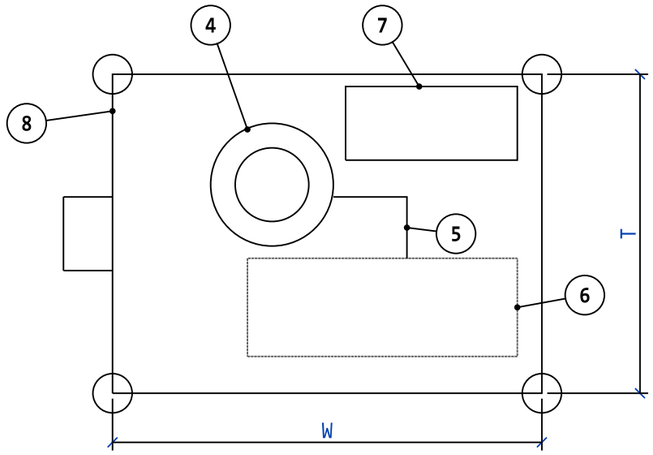
ELEVATION - RACK-MOUNTED STATION

NOT TO SCALE



PLAN - TROLLEY-MOUNTED STATION

NOT TO SCALE



NOTES

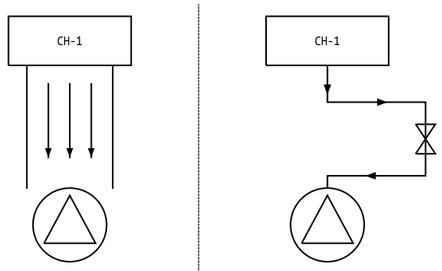
1. REFERENCE ARRANGEMENT OF A RACK-MOUNTED AND OF A TROLLEY-MOUNTED HIGH-VACUUM PUMPING STATION. THE LETTERS ARE DIMENSIONS SET BY DESIGN: NO PRESSURE, SPEED, FLOW OR SIZE VALUE IS GIVEN.
2. L IS THE LENGTH OF THE LINE FROM THE CHAMBER TO THE TURBOMOLECULAR PUMP AND D ITS DIAMETER. W AND T ARE THE WIDTH AND THE DEPTH OF THE TROLLEY.
3. DETAIL A: THE SPEED AT THE CHAMBER IS BELOW BOTH THE SPEED OF THE PUMP AND THE CONDUCTANCE OF THE PIPE. A SHORT, WIDE, STRAIGHT LINE LETS MORE OF THE PUMP'S SPEED REACH THE CHAMBER THAN A LONG, THIN, BENT ONE.
4. DETAIL B: THE CHAMBER IS ROUGHED FIRST, TP-1 IS STARTED ON THE FORELINE, AND GV-1 OPENS ONLY WHEN TP-1 IS AT SPEED AND THE PRESSURE PERMITS. THE VENT IS SLOW AND DRY.
5. DETAIL C: A CENTRING RING WITH A SEAL SITS BETWEEN TWO FLANGES AND A CLAMP PULLS THEM TOGETHER. THE BORE IS KEPT SMOOTH, WITH NO STEP, SO THAT THE LINE STAYS WIDE AND STRAIGHT.
6. THE FRAME CARRIES THE PUMPS SO THAT THEIR VIBRATION DOES NOT REACH THE CHAMBER OR THE GAUGE, AND KEEPS A CLEAR ROUTE FOR HOSES AND CABLES.
7. THE PROCESS SCHEMATIC, THE GAUGES AND THE HOLDS AND RELEASES ARE ON SHEET 001. CATALOGUE ITEMS ARE BOUGHT IN.

ITEMS

ITEM	DESCRIPTION
1	CHAMBER
2	SHORT, WIDE LINE
3	GATE VALVE
4	TURBOMOLECULAR PUMP
5	FORELINE HOSE
6	BACKING PUMP
7	CONTROLLER
8	FRAME OR TROLLEY
9	GAUGE
10	VENT VALVE

DETAIL A - THE PIPE SETS THE SPEED

NOT TO SCALE



SHORT, WIDE, STRAIGHT
MORE OF THE PUMP'S SPEED
REACHES THE CHAMBER

LONG, THIN, BENT
LESS OF THE PUMP'S SPEED
REACHES THE CHAMBER

DETAIL B - THE PUMPING ORDER

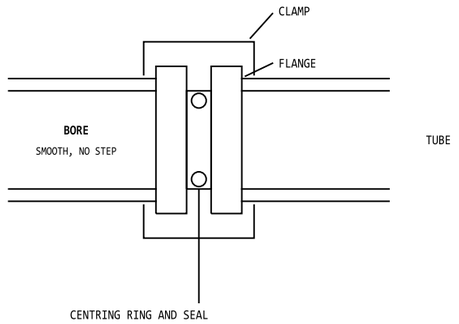
NOT TO SCALE

STEP	RV-1	FV-1	GV-1	TP-1	VV-1
ROUGH	OPEN	OPEN	SHUT	STOP	SHUT
START	SHUT	OPEN	SHUT	START	SHUT
RUN	SHUT	OPEN	OPEN	RUN	SHUT
VENT	SHUT	SHUT	SHUT	SLOW	OPEN

GV-1 OPENS ONLY WHEN TP-1 IS AT SPEED
AND PT-1 PERMITS. ORDER SET BY DESIGN.

DETAIL C - THE CLAMPED JOINT

NOT TO SCALE



REFERENCE CONFIGURATION - NOT FOR CONSTRUCTION

NEOMETRIX DEFENCE LIMITED
ENGINEERED IN NOIDA - INDIA

HIGH-VACUUM PUMPING STATION - REFERENCE CONFIGURATION

GENERAL ARRANGEMENT AND DETAILS

ELEVATION, PLAN, THE LINE, THE PUMPING ORDER AND THE JOINT

DWG NO	SCALE @ A3	SHEET	REV
NMX-HVP-89-002	NTS	2 OF 2	A
DATE	**UNITS**	**DRAWN**	**STATUS**
03-11-2026	TAGS ONLY	NMX-DO	REFERENCE