



CE
SEMI S2/8/10/14/22

M50 Liquid Nitrogen Condenser

A continuous duty device that converts facility gas into stable low pressure Liquid Nitrogen automatically for several years without maintenance or operator intervention. A 40-liter vacuum insulated tank stores the daily production (20-50 lpd). Touch Screen (HMI) and PLC controls provide for reliable and safe operation, with the KIC built-in auto-delivery system. LN₂ is delivered to the customer's dewar and **as easy as de-canting tap water**. Several options allows for a variety of applications.

Specifications

Storage Capacity: 40 liters (30-L for ASME VIII)
Peak Production: 25 / 55 liters per day
Standard Production: 20 / 50 lpd at 60 Hz
Purity: >99.99%
Dimensions: 56^W x 710^D x 187^H cm
Empty Weight: 670 kg
Environment: Clean Room Capable
Certifications: CE, SEMI

Features

Controls: PLC and Touch Screen
Operation: One-button with Auto-Start
Controls: Fully Automatic
Monitoring: Remote PC via Internet
Warranty: One Year from Installation
Extended Warranty: Life on Software & Instruments
Laboratory: Clean Room Ready
Enclosure: Austenitic Stainless Steel

Utilities

Cooling Water: 6 lpm at 2 barg (note 1)
Power for USA: 208 VAC, 3 ϕ for F model
208 VAC, 1 ϕ , for H model
Power for International: Same as above for 50 Hz

Options

Return Gas Heater: 1 kW with PID Controls
V.J. Transfer Line: 2.5 meter long
On-Site Installation: By KIC Service Engineers

Applications

Solid State Detectors
SEM, TEM, and TXRF
X-Ray Crystallography
Biological Storage and Preparation
IR Cameras
General Laboratory Supplier
Forensics and Dermatology

Many options and features are available to meet the customer's application and environmental conditions. Please consult with the KIC engineers regarding previous experience and custom designs.

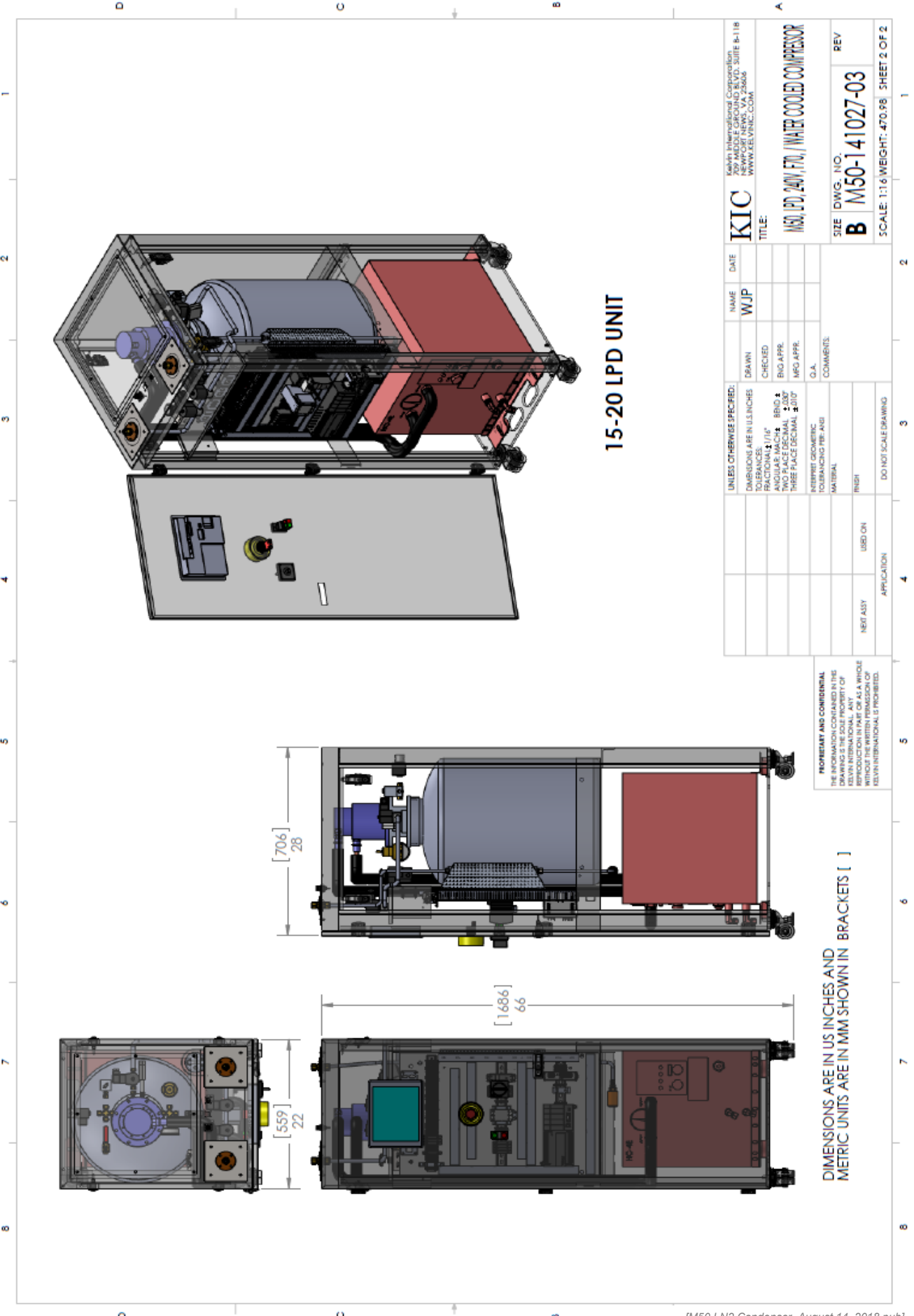
Distributed and Supported by:

M50 DETAILED PRODUCT SPECIFICATIONS

M50-H Standard Model	20 lpd 200-240 VAC, 50-60Hz, 1-phase (1)
M50-F Enhanced Production	40-50 lpd 200 or 400 VAC, 50-60Hz, 3-phase (1)
Arrangement	Austenitic Stainless Steel Enclosure with Clean-Room Casters for Class-100 Facilities. <65 dbA at 1 meter with standard enclosure. Includes a 40 liter dewar
Automatic Controls	<p>PLC and Touch Screen Controls provide fully automatic operation</p> <p>AUTO-START feature for when power returns</p> <p>Digital display of internal and external tank and ALARMS</p> <p>Electronic level gauge for automatic cycling operation</p> <p>Dewar set points (start-stop) can be controlled by customer</p> <p>Password protected functions for user to control access</p> <p>Touch screen push button of LN₂ delivery valve</p> <p>Automatic control and display of dewar pressure settings</p> <p>Purity venting for clean start-up of GN₂</p> <p>Calendar and daily operation timing for ON-OFF operation</p> <p>Self diagnostics on every start-up</p> <p>EMO Button for safety</p> <p>Built-in AUTO- DELIVERY of LN₂ for external Dewar</p> <p>iPad or Remote PC monitoring and operation are provided</p>
Warranty	A three-year warranty on all electronic and electrical components. Lifetime support on software and instrument calibrations.
Standards	This is a CE marked product that meets Health and Safety Standards set forth in the Machinery Directive on machinery safety, 98/37/EC and the International Standards: BS EN ISO 12100-1:2003, BS EN ISO 12100-2:2003, BS EN 294:1992, BS EN 349:1998, BS EN ISO 13850:2006, BS EN 60204-1:1998, BS EN 1050:1997. SEMI S2 Compliance and Certification are Pending (FY2015-3Q)
Shipping	All equipment is cleaned, bagged, and packed in reusable heat-treated wooden crates having an international crate shippers compliance standard. This allows for OEM to receive, integrate the M50, then re-ship to the final destination.
Performance and Quality	Every M50 is tested at KIC and must pass all Q/C inspections and performance testing prior to being released for delivery. Customers are invited to witness final inspection during the week-long performance testing procedure.
Long Life and Reliability	Cold head is maintained every 13,000 hours. Helium compressor interval is 30,000 hours. Service and parts are available world-wide.

(1) See Options and Utilities Sections

[M50 LN2 Condenser August 14, 2018.pub]



UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN US INCHES TOLERANCES: FRACTIONAL ± 1/16" DECIMAL ± .005" ANGLES ± .010" HOLE POSITION ± .010" THREE PLACE DECIMAL ± .010"		NAME WJP	DATE	KIC Kelvin International Corporation 209 MADOLE GROUND S.W.D. SUITE B-118 MADISON, WI 53717 WWW.KELVININC.COM	
DRAWN CHECKED ENG APPR. MFG APPR.		COMMENTS: Q.A.		TITLE: M50 LPD, 240V, FTU, WATER COOLED COMPRESSOR	
INTERPRET GEOMETRIC TOLERANCING PER: ASH	MATERIAL	FINISH	USED ON	SIZE DWG. NO. B M50-141027-03	REV
NEXT ASSY			APPLICATION		
DO NOT SCALE DRAWING			SCALE: 1:1.6 WEIGHT: 470.98 SHEET 2 OF 2		

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OPTIONS

Connecting to a Tool or Laboratory Device



KIC Engineers are eager to help customer determine the proper interfaces to connect to any laboratory device including SEM, NMR, Bio-Storage Refrigerators, or any device requiring LN₂. Since the automatic filling feature is already included along with Quiet, Force Fill and other operational modes, the interface would only require a cable and documentation. In addition, the M50 can be configured in a lower floor or with VJ transfer lines and a return gas heater.

Converting to a Liquid Nitrogen Generator



The M50 models can be converted from a condenser to a full feature generator by adding an optional enclosure containing a scroll air compressor, a 99.0-99.9% PSA Nitrogen gas generator, and cooling water recirculator, thus providing all utilities with the exception of electrical power. The auxiliary enclosure must be used outside the clean room and in an area where good ventilation (<35° C) is available in order to remove the additional 3 kW of heat. The water cooler option is only available in the standard model.

LN₂ Delivery Lines

The standard offering is a 0.375-inch diameter Swagelok bulkhead fitting on either side of the unit (customer to select) near the front. Vacuum Jacketed transfer lines are also available. Consult with the KIC Engineers to select the type, length, and enclosure arrangement. Two VJ lines are used in bio-laboratories for distribution along a line of cascading tanks. The Enhanced Model requires a chiller.

UTILITIES

Electrical Power
Standard (15-20 lpd)

1-phase Power is required for the following ranges
208-230 V (+/-5%) 3 kW, 16 A, at 60 Hz
200 V (+/-5%) 2.6 kW, 13 A, at 50 Hz
Transformers are required to operate outside these stated ranges. Consult with the KIC engineers for options. Transformers are required in EU locations.

Electrical Power
Enhanced (40-50 lpd)

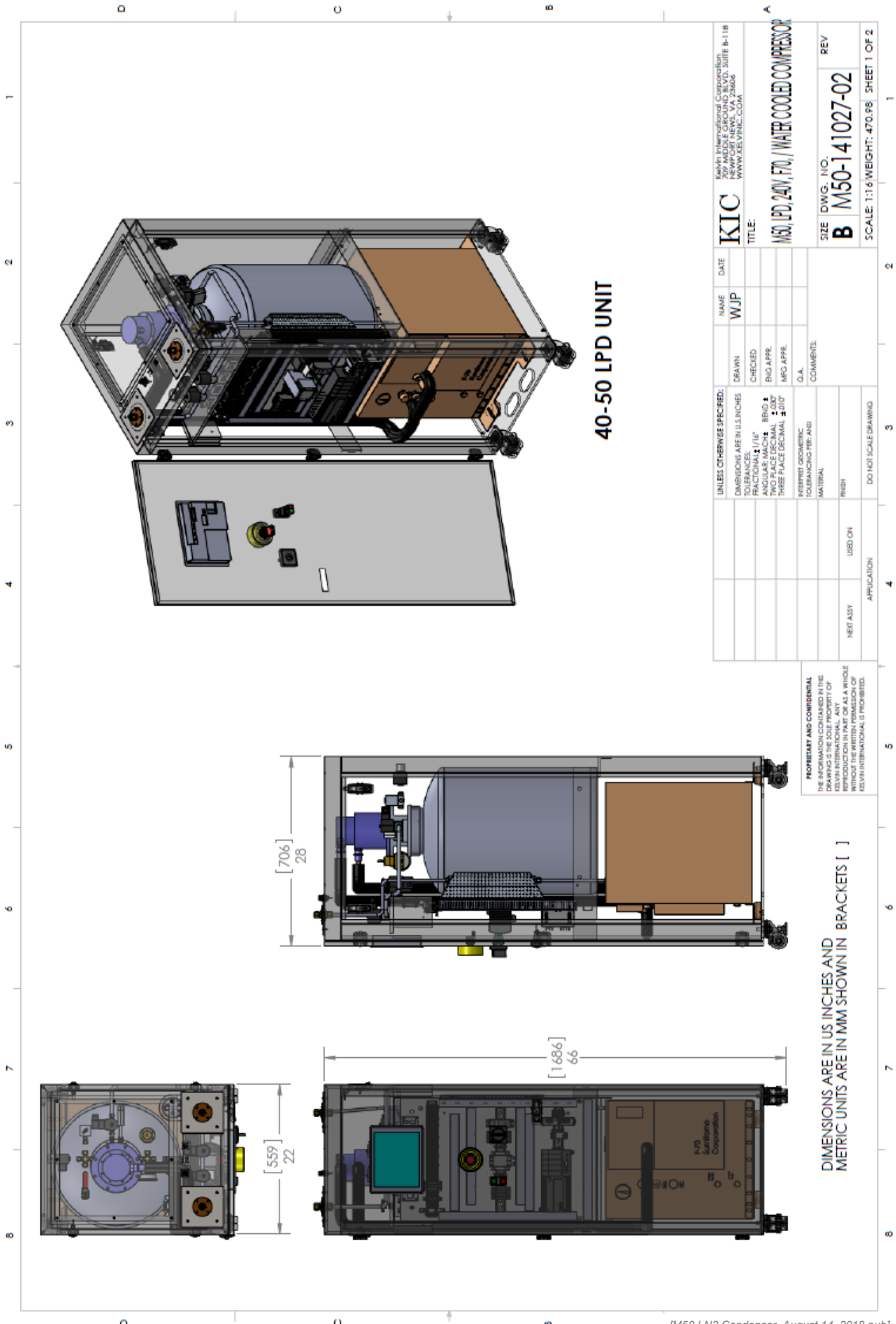
3-phase Power is required for the following ranges
480 V (+/-10%) 8 kW, 13 A, at 60 Hz
380-415 V (+/-10%) 7 kW, 13 A, at 50 Hz
200 V (+/-10%) 7-8 kW, 24 A, at 50-60 Hz
Transformers are required to operate outside these stated ranges. Consult with the KIC engineers for options.

Nitrogen Gas

>99% Purity with a D.P. of <-70° C, at 3-10 bar, 5-30° C
10 lpm for the Standard Model and 30 lpm for the Enhanced Type

Process Cooling Water

Standard Model (15-20 lpm) 4 kW minimum of cooling
7 bar MAX Pressure, 4-27° C inlet, 40° C outlet MAX, 2.7 lpm MIN
Enhanced Model (40-50 lpm) 8 kW minimum of cooling
8 bar MAX Pressure, 5-25° C inlet, 45° C outlet MAX, 6-9 lpm



40-50 LPD UNIT

UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN US INCHES		WJP	
FRACTIONAL 1/16"		DRAWN	
ANGULAR 30°		CHECKED	
TWO PLACE DECIMAL ±.030"		ENG APPR.	
THREE PLACE DECIMAL ±.010"		MFG APPR.	
INTERPRET GEOMETRIC TOLERANCING PER-ANSI		G.A.	
MATERIAL		COMMENTS	
FINISH			
DO NOT SCALE DRAWING			
NEXT ASSY	USED ON		
APPLICATION			

KIC
 Kelvin International Corporation
 1500 W. WASHINGTON AVE., SUITE B-118
 NEWPORT NEWS, VA 23606
 WWW.KELVINIC.COM

TITLE:
 M50, LPD, 240V, F70, WATER-COOLED COMPRESSOR

SIZE: DWG. NO. REV
B M50-141027-02 REV

SCALE: 1:1.6 WEIGHT: 470.98 SHEET 1 OF 2

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