



Technical Specification BACKUP TURNING GEAR

(Mod. 1355-TU-L)

KRŠKO NUCLEAR POWER PLANT

SP- G3050

Revision 1

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Augmented Quality

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15/01/2026

Date

RECORD OF REVISION

No.	Date	Reason for revision and revision summary	Affected pages
0		Initial issue	
1	15.01.2026	<p>The SUPPLIER shall provide a complete list of recommended spare parts for the Backup Turning Gear, including part numbers, quantities, and expected service life.</p> <p>The SUPPLIER shall define all lubrication and consumable requirements, including the type of oil or grease, air filter specifications, and recommended replacement intervals.</p> <p>The SUPPLIER shall submit a detailed maintenance and inspection manual, clearly specifying:</p> <ul style="list-style-type: none"> • Maintenance, lubrication, and inspection intervals for all key components • Frequency of lubrication • Torque checks • Air motor inspection • Coupling inspection • The SUPPLIER shall provide documented limitations and procedures for emergency stop and manual isolation of the air supply system. <p>The manual shall include step-by-step procedures for emergency stop and manual disconnect, ensuring safe operation and maintenance of the equipment.</p>	<p>9/10</p> <p>10/10</p>

TABLE OF CONTENTS

1	BACKGROUND AND DESCRIPTION OF PROBLEM	1
2	DEFINITIONS	1
3	SCOPE	1
3.1	Scope of Work.....	1
3.2	Equipment, Material, and Services to be Furnished by the SUPPLIER.....	2
3.3	Equipment, Material, and Services to be Furnished by OTHERS	2
3.4	Factory and Site Acceptance Test (FAT and SAT).....	3
4	CODES, STANDARDS AND REGULATORY REQUIREMENTS	3
4.1	Owner Specifications and Standards	3
4.2	Applicable codes and standards	3
5	SUPPLEMENTAL DATA	4
6	DOCUMENT SUBMITTAL.....	4
6.1	Information Required with the Proposal	4
6.2	Drawings.....	4
6.3	Detail Design Drawing (s)	5
6.4	Instruction Manual	5
7	PERFORMANCE REQUIREMENTS	5
8	FABRICATION AND ASSEMBLY	5
9	CLEANING, CORROSION PROTECTION AND COATING	5
10	MARKING AND IDENTIFICATION.....	5
10.1	Nameplate.....	5
11	PACKAGING, HANDLING AND STORAGE	6
12	RECORDS.....	6
13	OTHER REQUIREMENTS.....	6
14	RIGHT OF ACCESS	6
15	QA PROGRAM REQUIREMENTS	7
15.1	SUPPLIER's QA Program	7
16	SPECIAL HANDLING.....	7
17	SUPPLIER DOCUMENTATION REQUIREMENTS	7
17.1	Certificate of Conformance/Compliance.....	7
17.2	Documentation	8
18	NEK PROPRIETARY DATA	8

19	SOURCE INSPECTION/SURVEILLANCE NOTIFICATION	8
20	SHIPPING REQUIREMENTS	8
21	DELIVERY SCHEDULE	9
22	WITNESS AND HOLD POINTS.....	9
23	VENDOR TECHNICAL MANUAL.....	9
24	TRAINING	10
25	ATTACHMENTS.....	10

1 BACKGROUND AND DESCRIPTION OF PROBLEM

The rotor turning gear mechanism is used for precisely rotating and stopping the turbine rotor during an outage or shutdown. It can be operated either by an electric motor or manually. At the end of OL31, a test was conducted to manually start the rotor turning gear mechanism. The test was unsuccessful, and for that reason, a backup turning gear mechanism powered by compressed air will be installed.

2 DEFINITIONS

TU	Main Turbine and Auxiliary Systems
FME	Foreign material exclusion
NCR	Nonconformance Report
AQ	Augmented Quality
NSR	Non Safety Related
NEK	Nuclear Power Plant Krško
OTHERS	NEK or other company(ies) subcontracted by NEK
OWNER	Nuclear Power Plant Krško
PURCHASER	Nuclear Power Plant Krško
QA	Quality Assurance
FAT	Factory Acceptance Test
SAT	Site Acceptance Test
SUPPLIER	an entity, which supplies equipment and/or services to NEK per this Specification

3 SCOPE

3.1 Scope of Work

This Technical Specification, with references documents, covers the technical requirements for the design, shop fabrication, inspection, testing, cleaning, painting, packaging and shipping of one (1) air rotor turning device for turning gear, for the Krško NPP.

The SUPPLIER shall be responsible for compliance with all the detailed requirements presented in this Specification. Nothing in this Specification shall relieve the SUPPLIER of the responsibility for performing, in addition to the requirements of this Specification, such analysis, tests, inspections, and other activities which the SUPPLIER considers necessary to ensure that the design, material, and workmanship are satisfactory for the service intended, or as may be required by common usage or good practice.

Air rotor turning device for turning gear for Krško Nuclear Power Plant, to be used as backup turbine rotation.

3.2 **Equipment, Material, and Services to be Furnished by the SUPPLIER**

The WORK shall include at least the following:

- a. Complete detailed designs as applicable, including detailed drawings of attachments to the existing turning gear device.
- b. Reproducible outline and detail drawings of air rotor turning device, air inlet manifold and steel frame as well as all other deliverables.
- c. Complete plans and drawings of anchor bolt arrangements, in enough detail for installation.
- d. Foundation loads for air rotor turning device and steel frame on base plate. Bolts shall be arranged so that the load is evenly distributed on existing base plate or provision is made in the design for uneven distribution considering the usual tolerances of the bolt and existing hole location.
- e. Special tools and accessories if required for proper operation, maintenance, and safety of the air rotor turning device.
- f. Manuals for testing, maintenance, operation, repair, or replacement of the air rotor turning device.
- g. Air rotor turning device will include at least:
 - air motor with 1-5/8" output shaft bolted to its mounting bracket;
 - steel frame made of four vertical legs;
 - four steel 6" channels on top to support air motor;
 - two 3" angle cross-braces that bolt to top of Steel Frame and bolt to air motor bracket;
 - Turning Gear Motor Lovejoy coupling hub machined with a 2-1/2" hex on its OD;
 - Lovejoy coupling "jaws-in -shear" removable flex element and locking ring;
 - Air Motor Lovejoy coupling hub with a 1-5/8" bore;
 - 1" square drive x 2-1/2 impact socket that slides onto T/G motor 1" sq. extension shaft;
 - Lockable 1" ball valve, in-line filter/dryer unit, in line lubricator, in-line control valve with spring closed operating handle, control valve air exhaust silencer, air motor silencer;
 - The following work shall also be furnished by the SUPPLIER as indicated:
 1. Steel frame design for Air rotor turning device on existing foundation.
 2. Final corrosion resistant coating, colored orange as RAL2000.

3.3 **Equipment, Material, and Services to be Furnished by OTHERS**

The following services and facilities will be furnished by OTHERS:

- a. Air source at the JOBSITE:

Pressure psig (kp/cm2)	114-121 (8-8,5)
Flow rates scfm (m3/h)	max. 635.1 (1080)
Dew point temperature, °F(°C)	104 (-40)

- b. 3/4" air hose, EPDM rubber 200 PSI;
- c. BAL-Lube 2000, turbine oil mixture;
- d. Funnels and 1 gallon plastic lugs;
- e. Coupling cover, 12" wide x 0,010" shim sock and hose clamp;
- f. Air Tool Oil.

3.4 Factory and Site Acceptance Test (FAT and SAT)

- FAT (Functional qualification testing) will be performed at SUPPLIER's Facilities. SUPPLIER shall prepare a FAT procedures that shall be reviewed, commented and approved by NEK.
- SAT (Site Acceptance Test) will be performed and documented in PURCHASER's applicable field procedure.

SAT at NEK Site. SUPPLIER shall prepare a SAT procedures that shall be reviewed, commented and approved by NEK. Scope of Site Acceptance Testing shall envelope full scope of FAT already performed at equipment SUPPLIER 's facilities. SAT shall exercise full scope of functional and performance testing, including performance testing, which may not have been possible during FAT.

The SUPPLIER shall submit procedures and techniques for performing maintenance for the PURCHASER 's approval prior to use.

4 CODES, STANDARDS AND REGULATORY REQUIREMENTS

The design, construction, materials, and testing of the specified equipment shall be in accordance with the following Specifications, Standards, or Codes which form an integral part of this Technical Specification to the extent specified herein.

Where the referenced Codes and Standards contain recommendations in addition to requirements, the recommendations shall be considered as requirements and shall be followed unless stated otherwise by this Technical Specification.

4.1 Owner Specifications and Standards

- a. DCM-SD-089 Rev.0 Turbine auxiliary systems, Final system design description
- b. CDP 1332-TU-L Rev.0, "Conceptual design package – Vgradnja rezervnega Sistema za obračanje turbine"
- c. QS-610, Rev.2 (QA Specification – Generic Quality Assurance Program Requirements)

4.2 Applicable codes and standards

Design, construction, inspection, and certification shall be performed in accordance with the following specifications, standards, and codes:

ANSI American National Standards Institute

ASTM American Society for Testing and Materials

AISC American Institute of Steel Construction

AWS American Welding Society

ISO 12944 Paints and varnishes - Corrosion protection of steel structures by protective paint systems

Where the above referenced codes and standards contain design recommendations in addition to specification requirements, these recommendations shall be considered and implemented.

In the event of any conflict between codes or this specification, the more stringent requirement shall apply.

Selected codes and standards must be applied consistently throughout the project.

5 SUPPLEMENTAL DATA

Document QS-610, Rev.2 (QA Specification – Generic Quality Assurance Program Requirements) is a part of this Specification.

6 DOCUMENT SUBMITTAL

6.1 *Information Required with the Proposal*

Information to be supplied with the Proposal shall include at least the following:

- a. A list of the SUPPLIER'S design, fabrication, testing and inspection facilities, and capabilities.
- b. All deviations or exceptions to this Specification, listed on the attached Equipment Specification Exceptions form.
- c. Reproducible outline and detail drawings of the equipment.
- d. Completion and return of the attached Equipment Data forms.
- e. List of materials of construction.
- f. List of subsupplier/sub-subcontractors.
- g. Description of the packing for equipment and spare parts.
- h. Preliminary fabrication and inspection plan.

6.2 *Drawings*

The following PURCHASER's Drawing sets (see Attach. 4) forth the location is hereby made a part of this Specification:

<u>Drawings No</u>	<u>Rev.</u>	<u>Date</u>	<u>Status</u>	<u>Title</u>
732j613 sh1	16	30.11.1989.	ACT	TURNING GEAR AB
732j613 sh2	16	30.11.1989.	ACT	TURNING GEAR AB
732j613 sh3	16	30.11.1989.	ACT	TURNING GEAR AB
732j613 sh4	16	30.11.1989.	ACT	TURNING GEAR AB

6.3 Detail Design Drawing (s)

The SUPPLIER shall submit a complete set of Detail Design Drawings showing all details to PURCHASER for approval. These drawings shall be completed enough to permit engineering review of the design to ensure compliance with this Technical Specification.

6.4 Instruction Manual

The SUPPLIER shall furnish an instruction manual for Purchaser approval. The SUPPLIER shall indicate on the cover page the project name and Design Specification to which the instruction manual applies.

7 PERFORMANCE REQUIREMENTS

The performance requirements for the Air rotor turning device covered by this Technical Specification are identified in the Data Sheet Report.

8 FABRICATION AND ASSEMBLY

The Air rotor turning device has to be fully fabricated in workshop. Except where otherwise specified herein, fabrication procedures and qualifications shall be the SUPPLIER's standard which has proven satisfactory in the past and which meets applicable code requirements.

9 CLEANING, CORROSION PROTECTION AND COATING

Cleaning, Corrosion Protection and Coating shall be performed according to SUPPLIER's standard procedure with already proved satisfactory in past applications.

10 MARKING AND IDENTIFICATION

The SUPPLIER shall establish and maintain a system for the identification of materials, parts, and components. These measures shall ensure that identification of the item is maintained by the heat number, lot number, serial number, part number, or other appropriate means, either on the item or on records traceable to the item, throughout fabrication, shipment, and use of the item.

10.1 Nameplate

Air rotor turning device shall be marked using a durable label, which shall be corrosion resistant and resistant to the stored product.

The label shall be fixed to the tank on or close to the manhole of the tank. The label shall contain the following information as a minimum:

- Name and address of manufacturer

- Year of manufacture
- Speed in RPM
- Starting torque in lb/ft
- Serial number
- Code of Design
- Item number

Separate items such as: nuts, bolts, and gaskets shall be identified by tags bearing a description of the part, item number.

11 PACKAGING, HANDLING AND STORAGE

Packaging, handling and storage shall be performed in accordance with the SIST EN 12285-1:2003 Annex A - "Transport, storage and installation procedure".

12 RECORDS

Records shall be managed and maintained according to the requirement of SUPPLIER's Quality Assurance program.

A record system shall be established and maintained by the Supplier to provide documentary evidence of the quality of items and activities affecting quality. Quality Assurance records shall include results of reviews, inspections, test, audits, monitoring of work performance and material analysis. Records shall at a minimum identify Purchaser's name, order number, inspection and data recorder, data inspection that was performed, type of observation, procedures used, results, acceptability and action taken with deficiencies noted. Record of inspection shall also include identity of drawings and procedures utilized along with the revision level.

13 OTHER REQUIREMENTS

The SUPPLIER shall guarantee that materials used in the construction of the specified equipment are new and free from all defects.

The Supplier shall guarantee that the workmanship complies with all referenced Codes, Standards, and this Technical Specification.

Defects in material or workmanship that appear shall be repaired or the specified equipment shall be replaced at the Supplier's option and as approved by the Purchaser without cost to the Purchaser.

14 RIGHT OF ACCESS

The PURCHASER/OWNER/persons have the right of access to the SUPPLIER's facilities and records for the purpose of inspecting, auditing, and witnessing. These personnel, when will be present in SUPPLIER premises, will be informed on the regulation in force at the specific site.

All records issued by SUPPLIER or Sub-supplier, relevant for the contract, shall be

available for review to the Purchaser and Owner representative.

15 QA PROGRAM REQUIREMENTS

15.1 SUPPLIER's QA Program

The SUPPLIER shall provide a Quality Assurance Program and relevant requirements from QA specification NEK QS 610, Generic Quality Assurance Program Requirements.

The SUPPLIER shall submit one controlled copy of its Quality Manual to the PURCHASER for review and acceptance by PURCHASER QA department. The SUPPLIER shall implement and maintain this QA Program while carrying out the requirements of this specification. All proposed changes to the QA program shall be submitted to and approved by the NEK prior to implementation. In the case that SUPPLIER is already on NEK Approved Supplier List (ASL), written statement about present status and applicability of QA Program for required scope shall also be hand over in proposal.

The SUPPLIER shall ensure that its subcontractors meet applicable requirements of this Specification.

QA Program shall apply to all activities affecting the quality of supplied equipment, materials and services.

16 SPECIAL HANDLING

The SUPPLIER shall specify any special handling requirements and provide PURCHASER with appropriate procedure, which shall explain and emphasize them in detail.

17 SUPPLIER DOCUMENTATION REQUIREMENTS

17.1 Certificate of Conformance/Compliance

Each shipment shall be accompanied by certification containing the signature of a person responsible for the quality function of the Supplier, stating the material or items conform to all Purchase Order requirements. Applicable part numbers and other item identification, qualification reports and the Purchase Order number shall be references by the certification.

A Certificate of Conformance/Compliance shall be submitted by the SUPPLIER stating that the equipment is in conformance with the requirements of this specification. The Supplier and its Sub-Suppliers shall provide the Purchasers Quality Assurance personnel in writing that all referenced standards, codes and procedures have been compiled with.

17.2 Documentation

One paper reproducible and one electronic version (editable and in pdf), off all documentation requested for delivery per this specification shall be submitted for Purchaser review, comment and acceptance.

Drawings and data shall be identified with the owner's name and Purchase order number.

The final release of all documentation requested for delivery per this specification shall be submitted in one (1) paper reproducible copies and one (1) electronic version in pdf. All SUPPLIER's documents shall bear at least the following information:

- SUPPLIER's Name;
- Date of issue;
- Document number;
- Revision number;
- NEK item/ MFR part number;
- NEK Purchase Order number; and
- NEK Specification number.

18 NEK PROPRIETARY DATA

The PURCHASER has a proprietary interest in all of the drawings, designs, specifications, documents, information or know-how which may be furnished pursuant contract execution and in any know-how, improvement, discovery or invention which may be made, developed, or conceived in the performance of work hereunder or which may arise or result there from (hereinafter collectively referred to as the "Information"). All such information shall be considered to be proprietary to the NEK. The right to use of all such Information shall be transmitted to the SUPPLIER only for its personnel use and shall be entirely restricted to the performance of the contract and subject to the confidentiality provision.

19 SOURCE INSPECTION/SURVEILLANCE NOTIFICATION

Source inspection must be managed by the SUPPLIER according to the requirements of its Quality Assurance Program and Manual.

Notifications must be sent to the PURCHASER with "x" working days in advance of the scheduled time of performance, where "x" is here in after defined:

- 15 working days in case the witness/hold point involves also the Owner (NEK)

20 SHIPPING REQUIREMENTS

Each package shall be clearly tagged with the NEK identification number and NEK Purchase Order number.

Material and all certifications or accompanying documentation supplied within the

scope of this specification shall be directly shipped from the SUPPLIER to PURCHASER.

The PURCHASER's authorized source inspectors have the right to hold shipment if purchase order requirements are not met.

21 DELIVERY SCHEDULE

After contract award, the SUPPLIER shall, on the basis of delivery milestones defined in the contract, provide an integrated detailed delivery schedule with milestones for fabrication and delivery of component(s) which will be provided within the scope of this Specification.

22 WITNESS AND HOLD POINTS

The Supplier shall submit detailed manufacturing, testing and inspection plans for the NEK review and approval. Plans shall be approved prior to release or commencement of manufacturing activities and shall be defined by the SUPPLIER specific pre-planned Hold or Witness points throughout the fabrication process. The supplier shall not proceed beyond the hold point without written approval from NEK.

23 VENDOR TECHNICAL MANUAL

The SUPPLIER shall furnish vendor technical manual with all necessary information for operation and maintenance, updated specific data and equipment(s) drawings.

The SUPPLIER shall also provide drawings for all components and related equipment with a list of components, appertaining "part numbers" and their materials as part of the manual together with the list of recommended spare parts.

The SUPPLIER shall provide a complete list of recommended spare parts for the Backup Turning Gear, including part numbers, quantities, and expected service life.

The SUPPLIER shall define all lubrication and consumable requirements, including the type of oil or grease, air filter specifications, and recommended replacement intervals.

The SUPPLIER shall submit a detailed maintenance and inspection manual, clearly specifying:

- Maintenance, lubrication, and inspection intervals for all key components
- Frequency of lubrication
- Torque checks
- Air motor inspection
- Coupling inspection
- The SUPPLIER shall provide documented limitations and procedures for emergency stop and manual isolation of the air supply system.
- The manual shall include step-by-step procedures for emergency stop and

manual disconnect, ensuring safe operation and maintenance of the equipment.

24 TRAINING

The Supplier is required to provide formal SAT and maintenance training to the Owner.

25 ATTACHMENTS

Attachment 1: Turning Gear Specification Sheet

Attachment 2: Equipment Specification Exceptions

Attachment 3: Bidder's Equipment Data List

Attachment 4: Photos of the existing Air rotor turning device for turning gear

Attachment 5: Sketch of Air rotor turning device for turning gear

Attachment 6: Location of bolts, available to use for steel frame

Other drawings and technical documentation will be made available to the bidder/contractor upon signing a non-disclosure agreement. The documentation may contain trade secrets and confidential information, and must therefore be treated as confidential by the recipient and used exclusively for the purpose of preparing and executing the respective project. Without prior written consent, the documentation may not be reproduced, disclosed, or forwarded to third parties.

ATTACHMENT 1
TURNING GEAR SPECIFICATION SHEET
KRŠKO NUCLEAR POWER PLANT

- | | |
|---|--|
| 1. Component identification | |
| a. Name | BACKUP TURNING GEAR |
| b. Type | Air rotor turning device |
| c. Quantity | 1 |
| d. INO | TU/BTG |
| 2. Fluid | Air |
| a. Pressure psig (kp/cm ²) | 114-121 (8-8,5) |
| b. Flow rates scfm (m ³ /h) | available max. 635.1 (1080) |
| c. Dew point temperature, °F(°C) | 104 (-40) |
| 3. Starting torque lb/ft (kg/m ³) | 3.25 (5 206) |
| 4. Speed, RPM | 915 |
| 5. Ambient temperature | room temperature |
| 6. Design code/class | - |
| 7. Design temperature min/max, °F(°C) | - |
| 8. Design pressure psig (kp/cm ²) | - |
| 9. Plant location | |
| a. Location | TB, room 042 |
| b. Elevation | 115.55 |
| c. Inside/outside | Inside |
| d. Area required for steel structure
installation L x W x H ft (m) | 60.25 x 37.75 (1.836 x 1.151) |
| 10. Material | - |
| 11. Drawing number | 732J613 Sh1 r16
732J613 Sh2 r16
732J613 Sh3 r16
732J613 Sh4 r16 |

**ATTACHMENT 2
EQUIPMENT SPECIFICATION EXCEPTIONS
KRŠKO NUCLEAR POWER PLANT**

The BIDDER certifies that the Proposal is in complete and absolute agreement with this Specification, except as specifically outlined below (use additional sheets if required).

BIDDER'S NAME

MANUFACTURER'S NAME

QUOTATION NUMBER

SIGNATURE

TITLE

Exceptions from this Specification:

ATTACHMENT 3
BIDDER'S EQUIPMENT DATA LIST
KRŠKO NUCLEAR POWER PLANT

Each BIDDER shall return one copy of this form with all the blanks filled in.

BIDDER'S NAME

MANUFACTURER'S NAME

QUOTATION NUMBER

1. **Starting torque lb/ft(kg/m³)**

2. **Speed, RPM**

3. **Air Capacity**

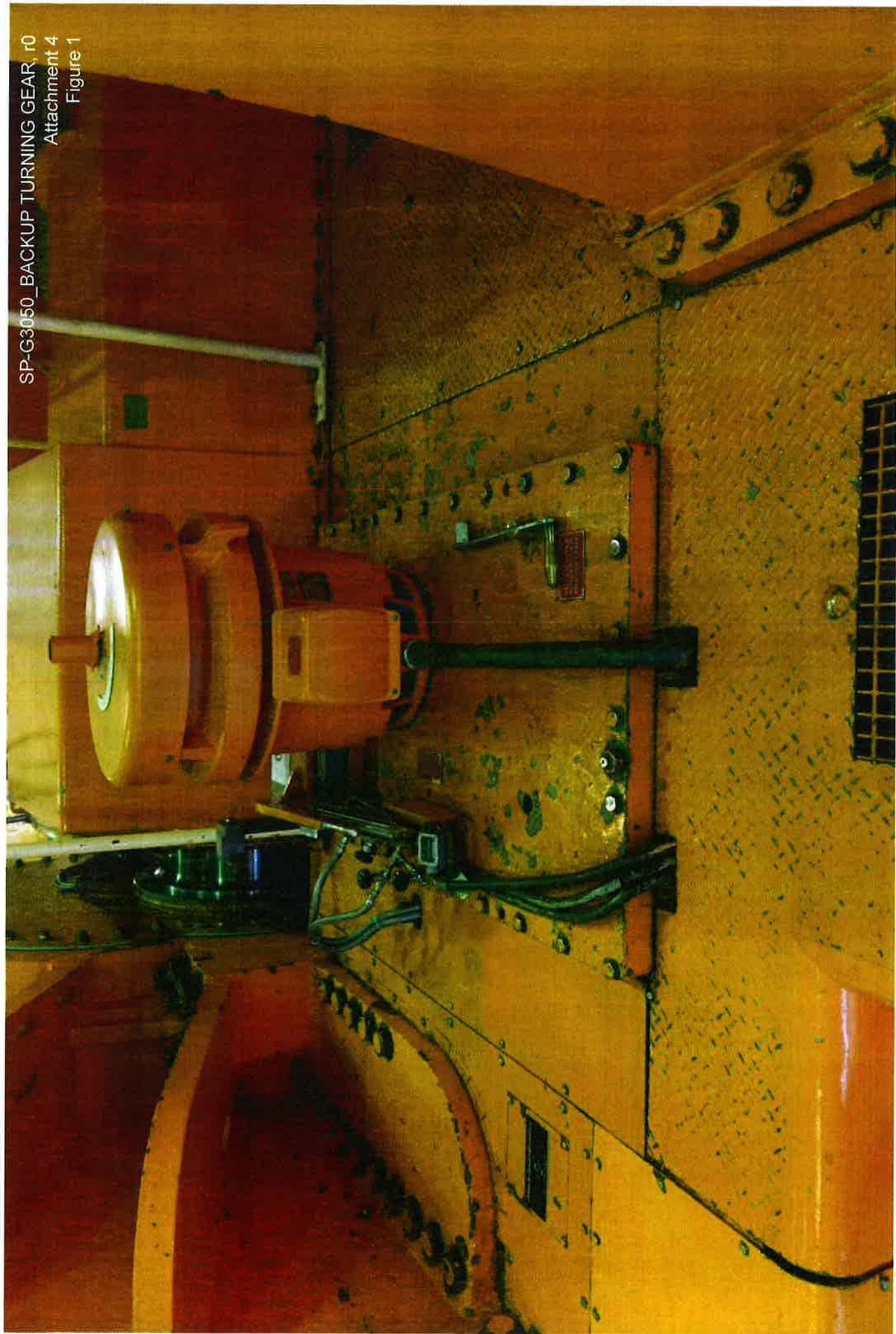
a. Pressure psig (kp/cm²)

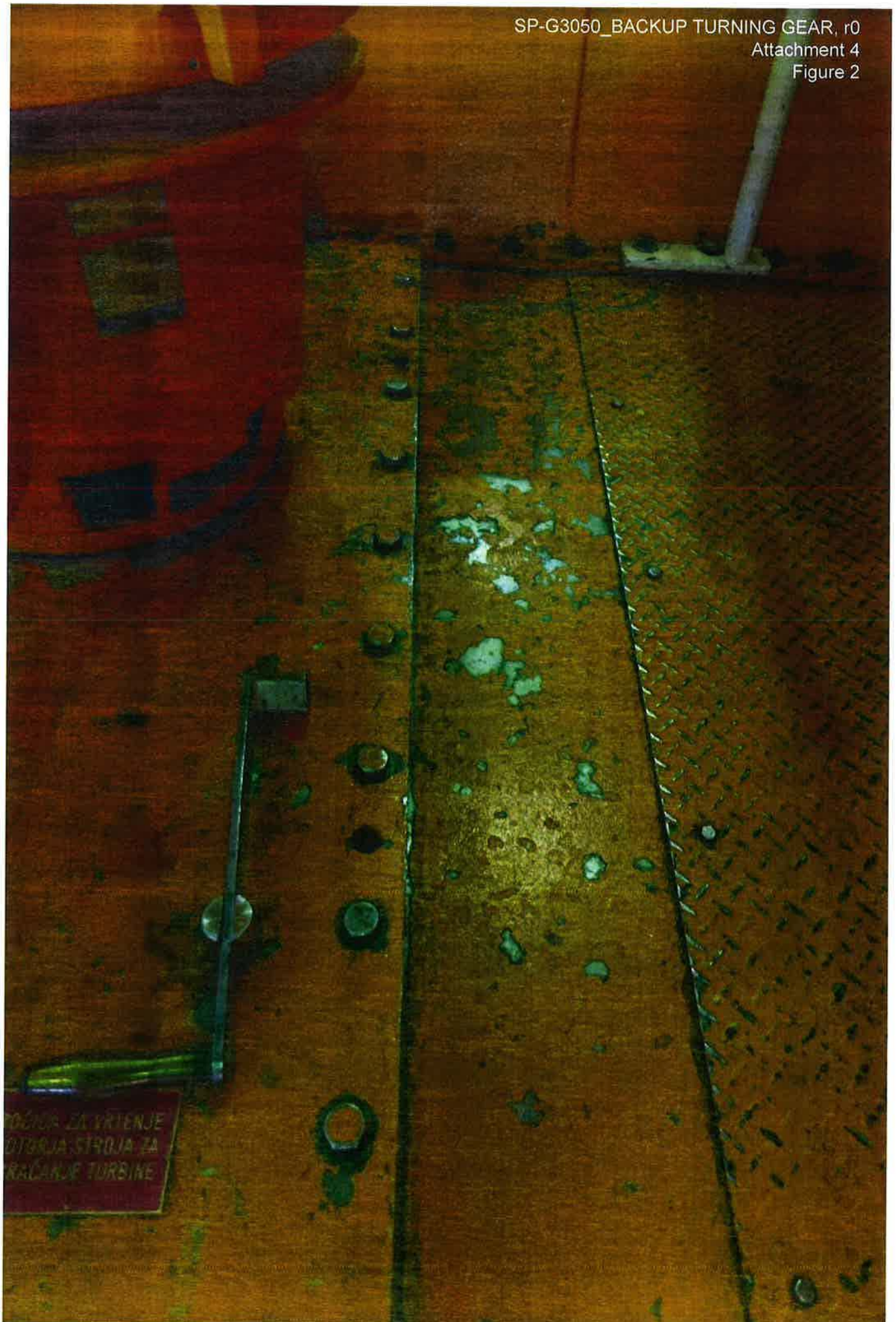
b. Flow rates gpm (m³/h)

c. Dew point temperature, °F(°C)

4. **Weight lb(kg)**

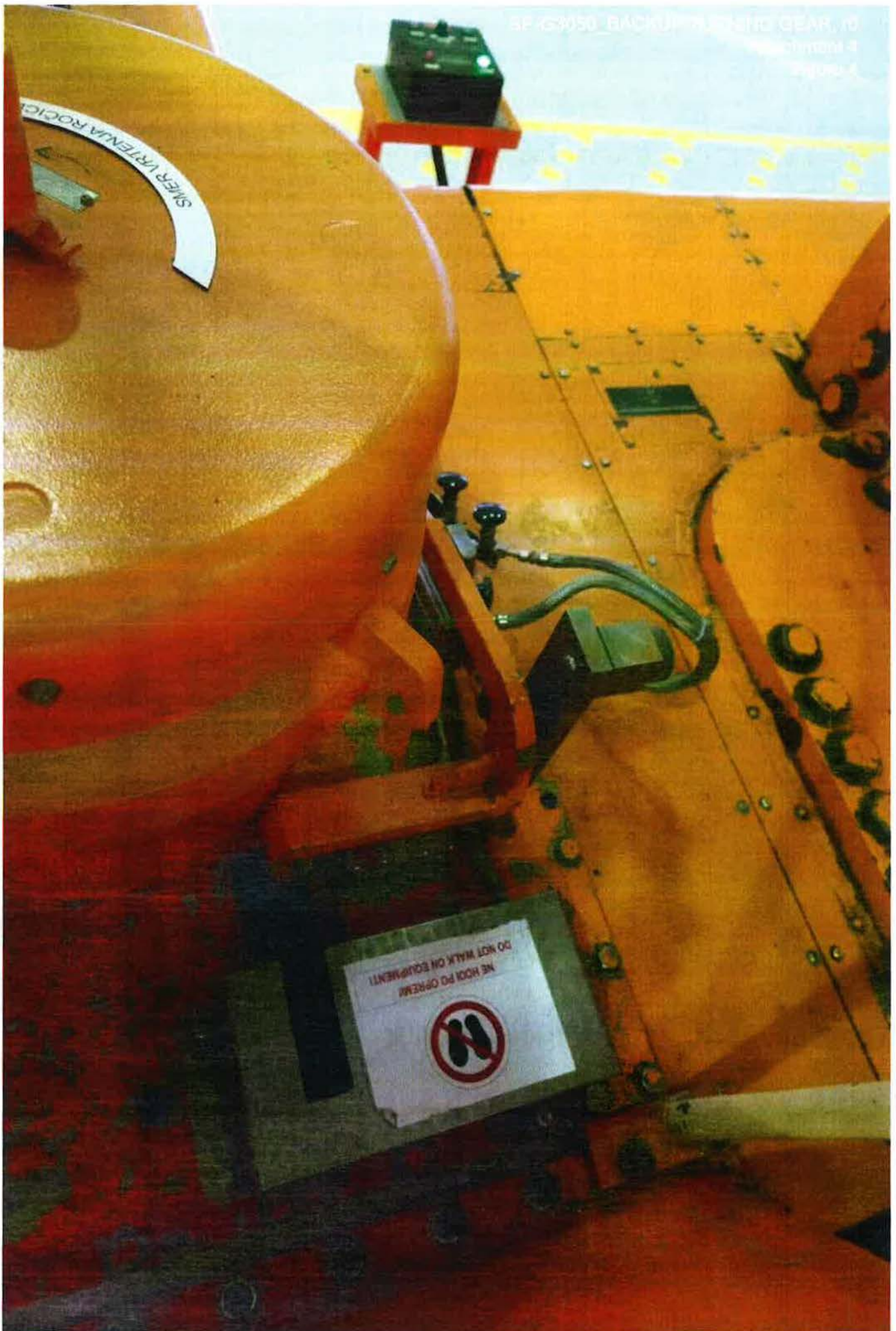
SP-G3050_BACKUP TURNING GEAR, r0
Attachment 4
Figure 1





SP-G3050_BACKUP TURNING GEAR, r0
Attachment 4
Figure 3

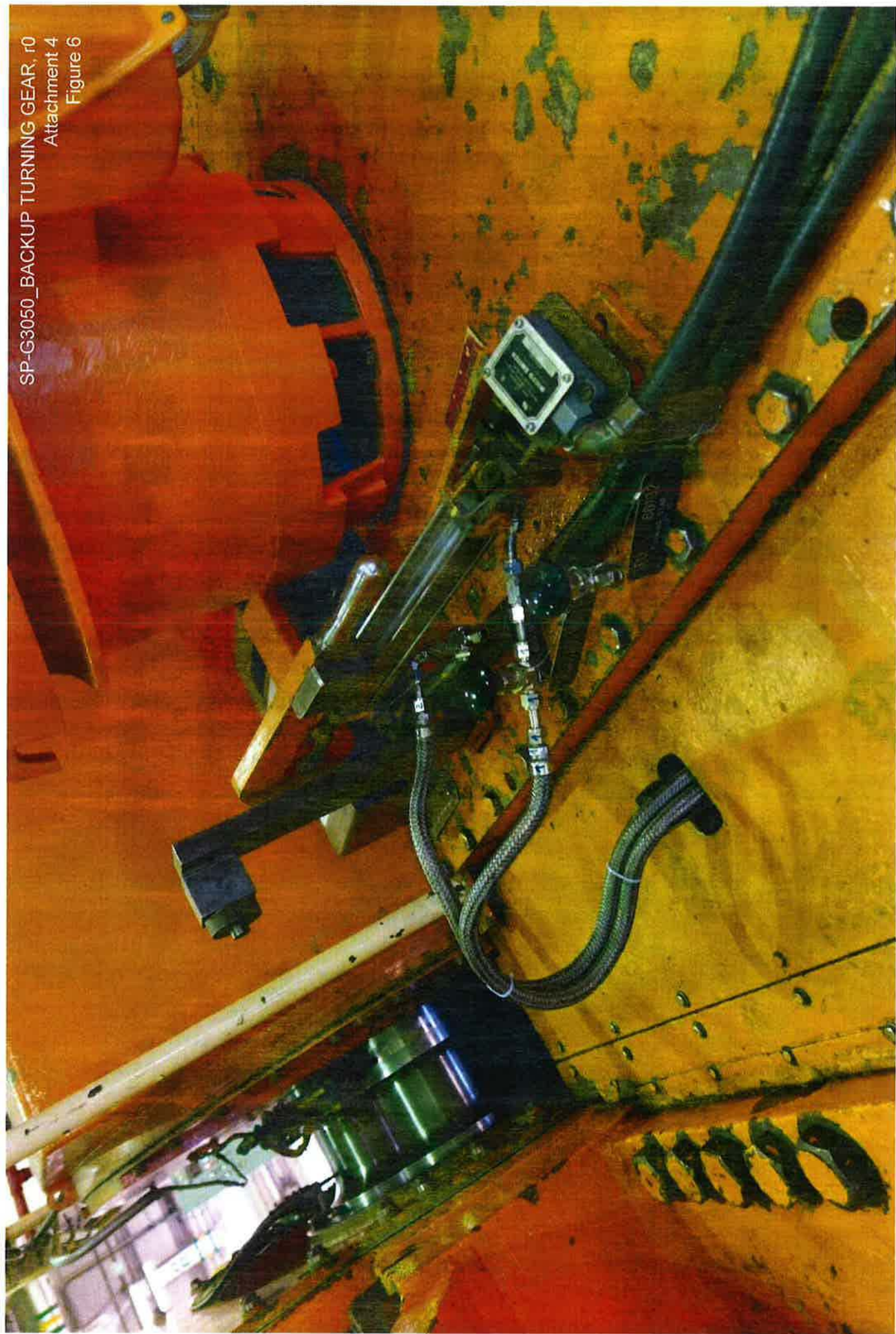


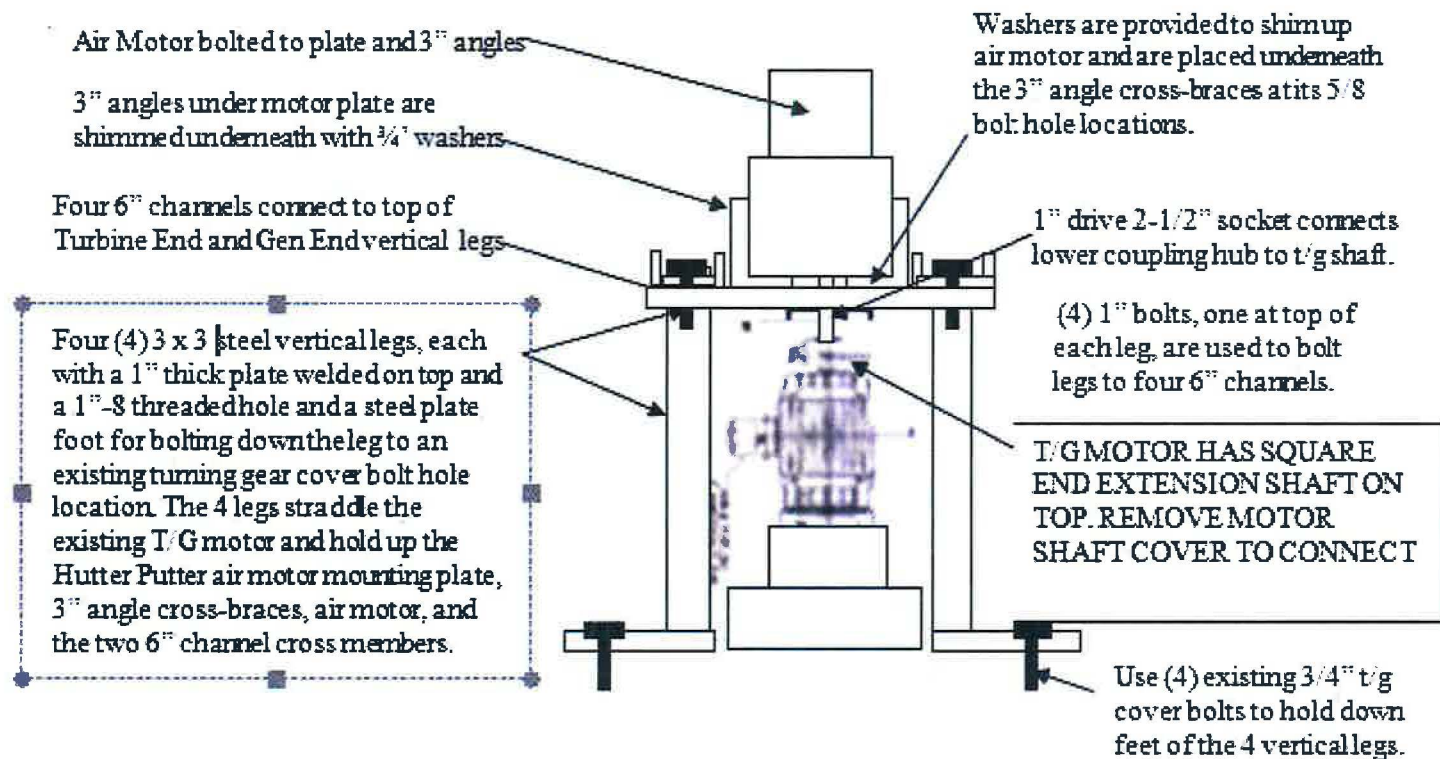


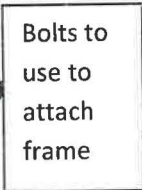
SP-G3050_BACKUP TURNING GEAR, r0
Attachment 4
Figure 5

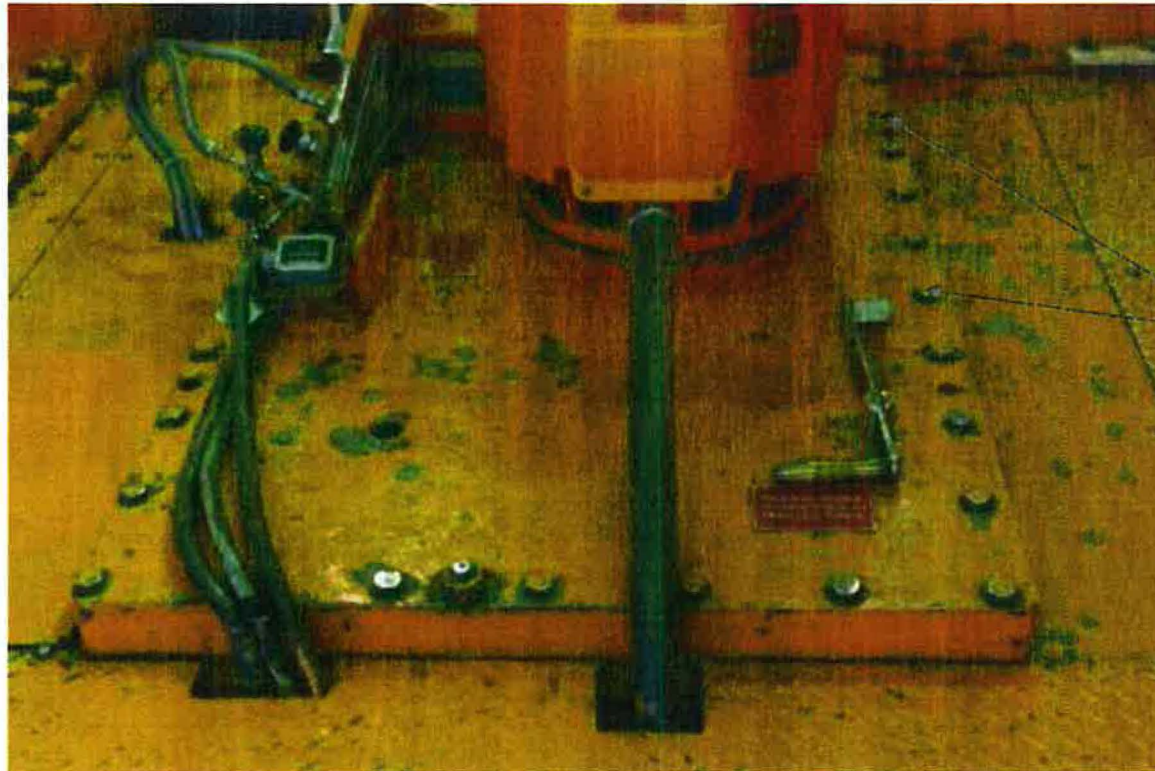


SP-G3050_BACKUP TURNING GEAR, r0
Attachment 4
Figure 6









Bolts to use
to attach
frame. Use
on LP side
and Gen
Side to
make
symmetric