INDEX

FOREWORD

This brochure has been prepared in an effort to put forth in a clear and concise manner the qualifications of our Design and Construction Team consisting of Rexach Construction Company, Lord Electric Company of Puerto Rico, Inc., Sam P. Wallace Company of Puerto Rico, Inc. and Víctor García & Associates. It is hoped that the information contained herein will be of value to you in your selection of the people necessary to satisfy your construction needs in Puerto Rico.

ADVANTAGES

A prime question in the mind of an owner would, naturally, be "What advantage would we have by using your 'team' in lieu of one of the 'giants' in the industry, that we are all familiar with?"

The question is a valid one and must be answered early in order for you to give our proposal serious consideration.

Here it is:

1. Rexach is the largest of the local contractors and Lord and Wallace are two of the giants in their fields, here and in the States. Víctor García is considered one of the most productive engineers in Puerto Rico, having served two terms as President of the College of Engineers.

2. All members of the team own, operate and maintain their own construction equipment and it is located now in Puerto Rico. You, the owner, do not have to pay for marine transportation.

3. The experience of the team members is Puerto Rican experience. Our foremen have cultivated crews which move from job to job thereby insuring continuity of supervision.

4. The team members know the Puerto Rican laws and what is required for compliance to them.

5. We also know the agencies in Government which must be dealt with and the manner of dealing. This includes the time required

for all steps to be taken prior to turnover of a project. This knowledge alone can prevent many "eleventh hour surprises" which prove costly in time and money.

6. This knowledge together with the close working relationship of the team members will expedite your project from start to finish.

7. Last but not least is the fact that your team members have the supply of competent, local management and supervisory personnel. This means that you do not have to pay the high cost of moving families and pets to Puerto Rico together with the high area supplements necessary to maintain them. In addition, the basic salaries of expatriate personnel is far in excess of that paid by the team members for the equivalent service.

AGREEMENT

This Agreement made and entered into as of this day of 19 , in San Juan, Puerto Rico, by and between hereinafter referred to as "The Owner," and REXACH CONSTRUCTION COMPANY, a division of Rexco Industries, Inc., a Puerto Rico corporation, hereinafter referred to as "The Contractor."

Wherein it is agreed:

ARTICLE I - Scope of Work

The Contractor shall furnish all necessary architectural, engineering and construction supervision, labor, equipment, tools, materials, supplies, insurance and incidentals (except as may be hereinafter referred to) necessary to design and construct the

ARTICLE II - Contract Documents

The contract documents consist of this Agreement, conditions of the contract (general conditions), drawings, specifications, (all addenda issued prior to this Agreement) and all modifications issued subsequent thereto. These form the contract and all are as fully a part of the contract as if attached to this Agreement or transcribed herein. If anything in the general conditions is inconsistent with this Agreement, this Agreement shall govern. A list of the drawings is attached hereto and noted as appendix A.

ARTICLE III - Architectural & Engineering Service

It is the intention of The Contractor to execute a standard agreement with Víctor García & Associates, 504 Muñoz Rivera Avenue, San Juan, Puerto Rico, for the architectural and engineering services to be performed under this Agreement. A copy of said Agreement is attached hereto and is noted as appendix B and all terms and conditions thereof except those pertaining to amount of fee shall become a part of this Agreement as if written herein. The Owner reserves the right to assign an associate architect of his own choice it being clearly understood that fees for same would be either paid directly by The Owner or added to the fees stipulated in this Agreement.

ARTICLE IV - Fee for the Work

In consideration of the performance of the work hereinbefore described, The Owner shall pay The Contractor a Composite Fee in the amount of
The Composite Fee is to include the fee for the general contractor's work (Rexach), electrical contractor's work (Lord), mechanical contractor's work (Wallace), and the architect-engineer (García). In addition to said fee The Owner shall pay The Contractor the "Contractor's Reimbursable Costs" incurred in the performance of the work, as said reimbursable costs are described hereinafter. The term "Contractor's Reimbursable

Costs" shall also apply to the electrical contractor's work (Lord) and the mechanical contractor's work (Wallace) as well as the general contractor's work (Rexach).

ARTICLE V - Reimbursable Costs

The following costs shall be paid to The Contractor as reimbursable by The Owner:

1. All labor directly on The Contractor's payroll, including social security, old-age benefits, taxes, Fondo del Seguro del Estado, and any other statutory tax or insurance and fringe benefits stipulated by union agreements or laws of the Commonwealth of Puerto Rico;

2. Salaries of Contractor's employees at the site of the work, in whatever capacity employed. Employees engaged, at shops or on the road, in expediting the production or transportation of materials or equipment, shall be considered as stationed at the field office and their salaries paid for such part of their time as is employed on this work;

3. Compensation for actual time spent by home office employees engaged on work for this project, plus two and one half times the actual time as mark up to cover all associated costs such as stenographic time, office materials and equipment and fixed charges. Employees covered under this clause would include but not be limited to: purchasing agents, expediters, project engineers and managers, equipment supervisors, personnel managers, scheduling engineers, safety engineers, etcetera. No charges to be made without prior approval of The Owner;

4. Salary charges for key personnel covered under paragraphs (2) and (3) above shall include a proportionate share of vacation time and fringe benefits in accordance with The Contractor's standard policies;

5. Cost of performing punch list work;

6. The cost incurred in moving personnel to the jobsite;

7. The proportion of transportation, traveling and hotel expenses of officers or employees of The Contractor incurred in discharge of duties connected with the project;

8. Permit fees, royalties, damages for infringement of patents, and costs of defending suits therefore and for deposits lost for causes other than The Contractor's negligence;

9. Losses and expenses, not compensated by insurance or otherwise sustained by The Contractor in connection with the work, provided they have resulted from causes other than the fault or neglect of The Contractor. Such losses shall include settlements made with the written consent of The Owner. No such losses or expenses shall be considered in the cost of the work for purposes of determining The Contractor's fee;

10. Cost of all items of equipment not rented from The Contractor, including small tools such as drop cloths, chain falls, water hose, cable, rope and all hand and power tools with a cost not in excess of $150.00, i.e., items which will be in continous use and is normally expected to expend its full

life expectancy within the duration of the job. These items shall be either retained by owner or sold at completion of project with all proceeds reverting back to The Onwer;

11. Materials, supplies, equipment services and transportation required for the proper execution of the work which shall include all temporary structures and their maintenance, including excise and any other taxes related thereto;

12. Premiums on all bonds and insurance policies including builder's risk naming all subcontractors as coinsurers and professional liability insurance on the architect. Premiums for boilder installation floater or equipment installation floater in amounts required;

13. The amounts of all subcontracts;

14. Costs of data processing for accounting in the general office and project cost reports, C. P. M., etcetera;

15. Relocation and travel expenses for expatriate personnel and their families from and to the mainland if required and approved by The Owner;

16. Excise taxes on equipment or material required in the performance of the work or any other taxes or fees required by Commonwealth or municipal government agencies but not including income taxes;

17. Cost of cleanup and removal of all debries;

18. Costs incurred due to an emergency affecting the safety of persons and property;

19. Rentals of all construction plant or parts thereof, whether rented from The Contractor or others, in accordance with rental agreements approved by The Owner. Transportation of said construction plant, cost of leading or unlading, fuel and lubricants, freight charges, assembling and disassembling, taxes and insurance, and repairs shall be in accor with terms of said agreement;

20. Other costs incurred in the performance of the work if and to the extent approved in advance in writing by The Owner.

ARTICLE VI - Payment

The Owner shall establish an imprest fund which shall be used to pay project expenses. At the end of each month The Contractor shall submit a fully substantiated accounting of the months, expenditures for The Owner's approval. Should The Owner fail or refuse to establish an imprest fund, then The Owner shall pay The Contractor as additional "Contractor's Reimbursable Cost" under Article V above the cost of interest on The Contractor's capital used at the ~~prime~~ applicable rate of interest in effect at the time payments are due.

Also, The Contractor shall, monthly, at least ten days before each progress payment falls due, deliver to The Owner a certificate for payment showing in complete detail, all moneys paid out including all payments made to subcontractor and supplier, or costs incurred by him on account of the cost of the work during the previous month for which he is to be reimbursed under Article 5, and the amount of Contractor's fee due as provided in Article 7, together with specifically schedule for which The Contractor warrants

payment immediately upon receipt of the funds from The Owner. The Contractor shall provide all the objective verifiable evidence requested by The Owner to verify such cash outlays or schedule paument of the current and prior months.

ARTICLE VII - Discounts, Rebates and Refunds

In the event The Owner establishes an imprest fund as described in Article VI above and The Contractor is able therewith to honor invoices allowing discounts, then all trade discounts, cash discounts, rebates and refunds shall be credited to The Owner. In addition, all returns from sale or surplus material shall be credited to The Owner.

ARTICLE VIII - Purchasing

Purchasing, whether done at the jobsite or the general office shall be in accordance with procedures mutually agreed to. No purchase over $500.00 to be made by The Contractor without prior approval of The Owner's representative.

ARTICLE IX - Construction Equipment

A. Contractor - Owned Rental Equipment

All expenses incurred hereunder for the rental of necessary construction equipment shall be subject to the prior approval of The Owner. Equipment thus furnished by The Contractor shall be subject to the following conditions:

1. Construction equipment shall be in good operating condition when delivered to the site, and shall be returned in same, less ordinary wear and tear.

2. Contractor shall be reimbursed for furnishing all construction equipment necessary for the work at the current monthly rates published by the Associated Equipment Distributors (AED).

3. All reimbursement of actual rental charges will be based on a normal forty-hour work week. However, if during the course of the work the job requires scheduled overtime, or more than one shift per day on a continuing basis, then additional rental at % of current AED monthly rates shall be charged for any and all equipment used during such overtime.

4. The Contractor shall be reimbursed for actual costs incurred for all repairs, except the cost of major repairs, if any, required within the first thirty days of actual operation of the equipment at the site, shall not be reimbursable.

5. Field repairs shall be in accordance with AED procedures. Should the Contractor elect to make repairs at its central maintenance shops in San Juan or elsewhere off site then the cost of transportation to the outside shop and return to the jobsite shall be for the account of The Contractor.

6. Contractor shall be reimbursed for transportation or moving costs actually incurred in delivering construction equipment to the construction site and returning such rented equipment to The Contractor's yard, provided, however, that the costs reimbursed shall be the minimum cost, everything considered, for which the transportation could be made. If any of such equipment

is shipped from the construction site to any other job unrelated to the work, shipping costs shall be borne by The Contractor. The Contractor shall obtain Owner's approval before incurring any costs under this paragraph.

7. Contractor shall be reimbursed for costs of fuel and lubricants.

8. Contractor-owned equipment placed on the job will not be subject to purchase by The Owner.

9. Rentals shall beging when equipment arrives at the jobsite and terminates three workdays after The Contractor's superintendent and Owner's representative declare equipment no longer required and available for transfer or return to yard.

B. Third Party Rentals

If for any reason The Owner approves or requires the rental of construction equipment from a third party, The Contractor shall be reimbursed for all costs incurred incident to such rental.

C. Purchased Construction Equipment

The Contractor shall be reimbursed for the purchase cost including transportation to the jobsite and unloading, assembling, disassembly, of construction equipment purchased with the prior written approval of The Owner. Construction equipment so obtained shall become the property of The Owner.

ARTICLE X - Subcontracts

Portions of the work may be subcontracted at The Contractor's option. However, The Contractor shall request bids from subcontractors and shall deliver such bids to The Owner. The Owner, with advice of The Contractor, will then determine which bids will be accepted.

The Contractor shall not be held responsible for non-performance of subcontractors chosen by The Owner and from whom a bond guaranteeing his performance was not required by The Owner.

ARTICLE XI - Correction of Work

Correction of improper or faulty workmanship due to the negligence of The Contractor shall be at the expense of The Contractor. Costs of correcting minor defects due to human error shall be reimbursable.

ARTICLE XII - Changes

The Owner may, from time to time, by written instructions, order changes requiring additions or deletions from the scope and/or scope of the work. Should the changes increase The Contractor's reimbursable cost of the work then The Contractor and The Owner shall in good faith prepare an estimate of the change and negotiate an equitable adjustment in the contractor's fee.

ARTICLE XIII - Contractor's Accounts

The Contractor shall check all materials and labor entering into the

work and keep such complete records and accounts of same as is necessary for the proper execution and administration of this Agreement. The Owner shall be afforded full and complete access to all records affecting the reimbursable cost of the work.

ARTICLE XIV - Prosecution of Work - Delays

The Contractor shall complete the work in accordance with the progress schedule prepared by The Contractor and approved by The Owner. If from time to time The Contractor is delayed in the progress of the work through no fault of his own, such as acts of god, riots, strikes, civil disorders, acts or failure to act by The Owner, Commonwealth or municipal governments or their agencies, etcetera, then the time for completion shall be extended by the amount of time lost due to the aforenoted delays. The Contractor recognizes the trust placed in it by The Owner in this Agreement as well as the importance of time to production schedules of The Owner. Therefore, The Contractor agrees to use its best efforts to minimize the effect of any such delays and recommend to The Owner alternate courses of action to do so.

For the purpose of this clause, the work shall be considered as substantially complete and fulfilling the intent of this Agreement when The Owner is able to occupy and use all or substantially all of the facility for the use for which it was designed.

ARTICLE XV - Title to Work

Title to all work completed, or in the process of completion, and to all materials, equipment, tools, or supplies purchased for the work by The Contractor, shall reside in The Owner upon The Contractor being reimbursed for same.

ARTICLE XVI - Termination

If The Contractor should be declared insolvent, or persistently refuse to supply sufficient skilled workmen, materials, equipment, tools or supplies when such are available, or resistently disregard instructions from The Owner, or be guilty of gross violations of this Agreement, The Owner may, upon ten days written notice to The Contractor, terminate the contractor's right to proceed further with the work. In the event of such termination, The Owner may take possession of the work, and of all materials, equipment, tools, supplies, etcetera, purchased for the work for which The Contractor has been paid, and complete the work in a manner deemed most expedient by The Owner, but The Contractor shall then not be responsible for the final date or cost of completing the work. In event of termination, The Owner shall pay The Contractor for reimbursable costs incurred by The Contractor up to the date the termination became effective, together with that portion of the Contractor's fee earned to that time.

ARTICLE XVII - Equipment Installation

In event the work includes the installation and/or start-up of owner furnished production equipment then the following shall apply. The Owner shall coordinate delivery to jobsite with The Contractor so as to minimize handling and storage costs. Upon completion of installation, The Contractor shall notify The Owner of time and date of start-up and check out so that The Owner may have a representative present. Upon successful completion of start-up and check out The Owner will issue an acceptance of piece or

pieces of equipment to The Contractor. The Contractor shall no longer operate the equipment and all guarantee or warranty periods covering the liability of The Contractor shall commence. The Owner shall hence forth have sole and full responsibility for operation of the equipment.

ARTICLE XVIII - Assignment

This Agreement may not be assigned in whole or in part by either party hereto without the express prior written approval of the other party.

In witness whereof, the parties hereto have caused this Agreement to be executed by their duly authorized officers or representatives as of the day and year first above written.

REXACH CONSTRUCTION COMPANY,
a division of Rexco Industries, Inc.

By _____

Attest:

_____

_____
The Owner

Attest:

_____

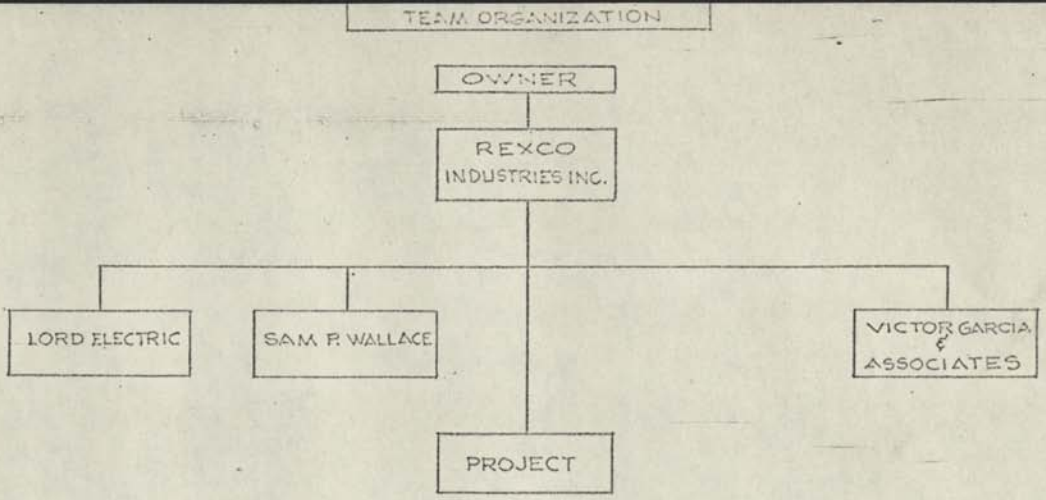
SALARY RANGES

Listed below are salary ranges of key personnel that would be employed on the work by the members of the team.

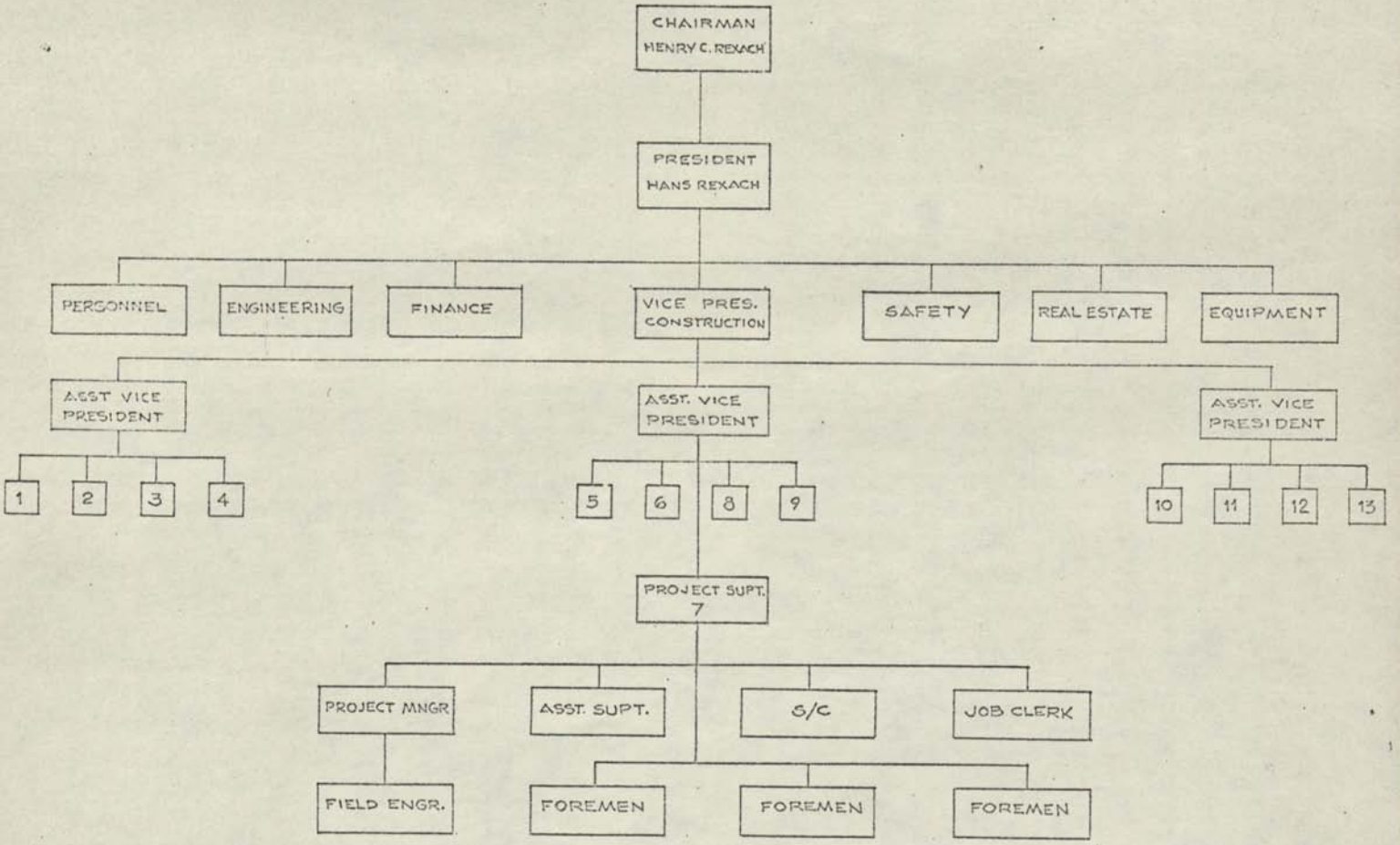
	ANNUAL	
	FROM	TO
Assistant Vice President (Construction)	$25,000	$35,000
Area Superintendent	18,000	24,000
Project Superintendent	12,000	18,000
Project Engineer (G. C.)	10,000	16,000
Superintendent (Mechanic)	15,000	17,000
Contract Manager (Mechanic)	15,000	17,000
Project Engineer (Mechanic)	10,000	12,000
Field Manager	9,000	12,000
Project Manager (Electric)	11,000	15,000
Timekeeper	6,000	8,000
Field Office Clerk	6,000	10,000
Purchasing Agent (Mechanic)	9,000	11,000
Staff Engineer (Mechanic)	10,000	12,000

ORGANIZATION

On the following pages are descriptions of the organizations that the owner would deal with together with the responsibilities of the people involved.



The Organization Chart shown above indicates the relationship that would exist between the owner and the Design and Construct Team and the relationship within the team. Under our proposal you would execute one contract with Rexach which would provide for one composite fee to cover fees for all four team members. Rexach would be the leader of the team and would be responsible for coordinating the efforts of all members and payment of fees to same.



REXCO INDUSTRIES INC.
ORGANIZATION CHART

ASSISTANT VICE PRESIDENT

Responsible for the overall management, profitability and quality of projects under his control. Prepares subcontract agreements.

PROJECT SUPERINTENDENT

Under guidance of Assistant Vice President is responsible for the technical, supervisory and administrating areas of the project.

PROJECT ENGINEER

Responsible for field engineers, cost reports, coordinating and purchasing for the project.

GENERAL FOREMAN

Reports to Superintendent and is reponsible for specific job areas.

CHIEF PROJECT CLERK

Handles all administrative business details including processing of invoices, payroll data, cost data, etc.

RESUMES

On the following pages will be found a few resumes of the more than fifty supervisory personnel in the Engineer to Area Superintendent category. In addition, twelve of the Company's fourteen officers are also graduate engineers.

Carlos Hernández	-	Assistant Vice President	
Age	-	42	
Education	-	UPR B.S. Engineering	1953

Experience:

	Self-employed
1964	Rexach Construction Company (Jardines Monte Hatillo) Project Engineer
1969	Assistant Vice President (El Conquistador) (Rexville) (Banco de Ponce) (Minillas foundation) (Rexmanor)

Milton Garcés	-	Assistant Vice President
Age	-	45
Education	-	UPR B. S. Engineering 1949

Experience

1949-1952	Autoridad de Hogares División de Estudios Inspección de Construcción
1952-1953	Eastern Construction Co. Caserío Naguabo
1953-1954	Departamento de Obras Públicas
1954-1956	Rexach-Corbetts & IBEC (Proyecto Las Lomas)
1956-1960	Capitol Construction Co. (Rexach & Blythe Co.) Roosevelt roads
1960-1963	Rexach Construction Company (Project Manager)
1963-1966	Cali, Colombia (ViPasa) (Assistant Vice President)
1966	Assistant Vice President (Rexach)

Miguel P. Vélez	-	Assistant Vice President
Age	-	41
Education	-	UPR B. S. Engineering 1955 Master Degree Engineering

Experience:

1955-1956	Professor at CAAM
1957-1958	Professor at CAAM
1958-1959	Rexach Construction Company (Field Engineer)
1959-1961	Rexach Construction Company (Engineer in Estimating Department)
1962-1964	Rexach Construction Company (Field Superintendent)
1964-1967	Project Manager
1967-1971	Assistant Vice President

Gustavo Arrillaga	-	Area Superintendent	
Age	-	46	
Education	-	UPR B.S. Engineering	1945

Experience:

1965-1966	Lanlord Puerto Rico Const. Corp. Project Engineer
1965-1963	Project Engineer
1962-1963	London Puerto Rico Const. Corp. Project Engineer
1946-1953	Autoridad sobre Hogares Inspector
1969-1970	Rexach Construction Company Project Superintendent
1970-1971	Rexach Constructon Company Area Superintendent
1968-1969	Rexach Construction Company Río Yaguez
junio 1968	Rexach Construction Company PR-167 Carretera Bayamón-Comerío
marzo 1968	Rexach Construction Company Project Engineer - El Remanso
1967-1968	Rexach Construction Company Project Dngineer - El Conquistador

Iván Vissepó	-	Area Superintendent	
Age	-	34	
Education	-	UPR BSCE	1963

Experience:

1963-1964	Molina & Rabell Project Engineer
1964-1965	Rexach Construction Company Project Engineer Urbanización Ramírez de Arellano
1970-1971	Area Superintendent

Río Yaguez channel
Guayanilla Yauco
Nursing home
Housing

Luis Angleró	-	Project Superintendent
Age	-	40
Education	-	UPR BSCE engineer

Experience:

1970-1971	Rexach Construction Company Project Engineer
1968=1970	Rexach Construction Company Rexville - Field Engineer

Efraín Medina	-	Project Superintendent
Age	-	49
Education	-	UPR BSCE engineer

1970	Rexach Construction Company Project Superintendent
1965-1970	Rexach HRH (Universal) Hi Rise V. A. Hospital Chase building El Monte Apartments Banco de Ponce

Santiago Castrodad	-	Project Superintendent
Age	-	40
Education	-	B. S. Civil Engineer North Carolina state 1953

Experience:

1. The Lumus Co.
   Job Engineer

2. Brown-Root
   Supt. Piping.
   Etheylene Glycole Plant

3. Union Carbide
   Design Engineer

4. IBEC Realty
   Superintendent Del Sur Shopping Center

5. Jaime Fullana
   Superintendent - St. Regis Paper Plant
   Industrial Development

6. Luis A. Ferré
   Superintendent - Ponce Museum

7. Rexach
   Project Superintendent
   Housing
   National Packing

Juan Gatell	-	Project Engineer
Age	-	46
Education	-	UPR BSCE Engineer

Experience:

1965-1969	Rexach Construction Company Project Engineer - El Mundo
1969-1971	Rexach Construction Company Banco de Ponce

Edgardo Díaz Cruz	-	Field Engineer	
Age	-	54	
Education	-	UPR A. M. C.	1948

Experience:

1969-1971	Rexach Construction Company Expreso De Diego
1968	Rexach Construction Company PR 5-25 Caserío Cataño
1968	Rexach Construction Company Rexville
1969	Rexach Construction Company Minillas Government Center

Felipe Allende Carcaño	-	Field Engineer	
Age	-	57	
Education	-	UPR B.S.	1942

Experience:

1971	Rexach Construction Company Res. La Guadalupe
1970	Rexach Construction Compamy La Flaca
1969	Rexach Construction Company Guayanilla Yauco
1967	Rexach Construction Company Cataño Housing
1965	

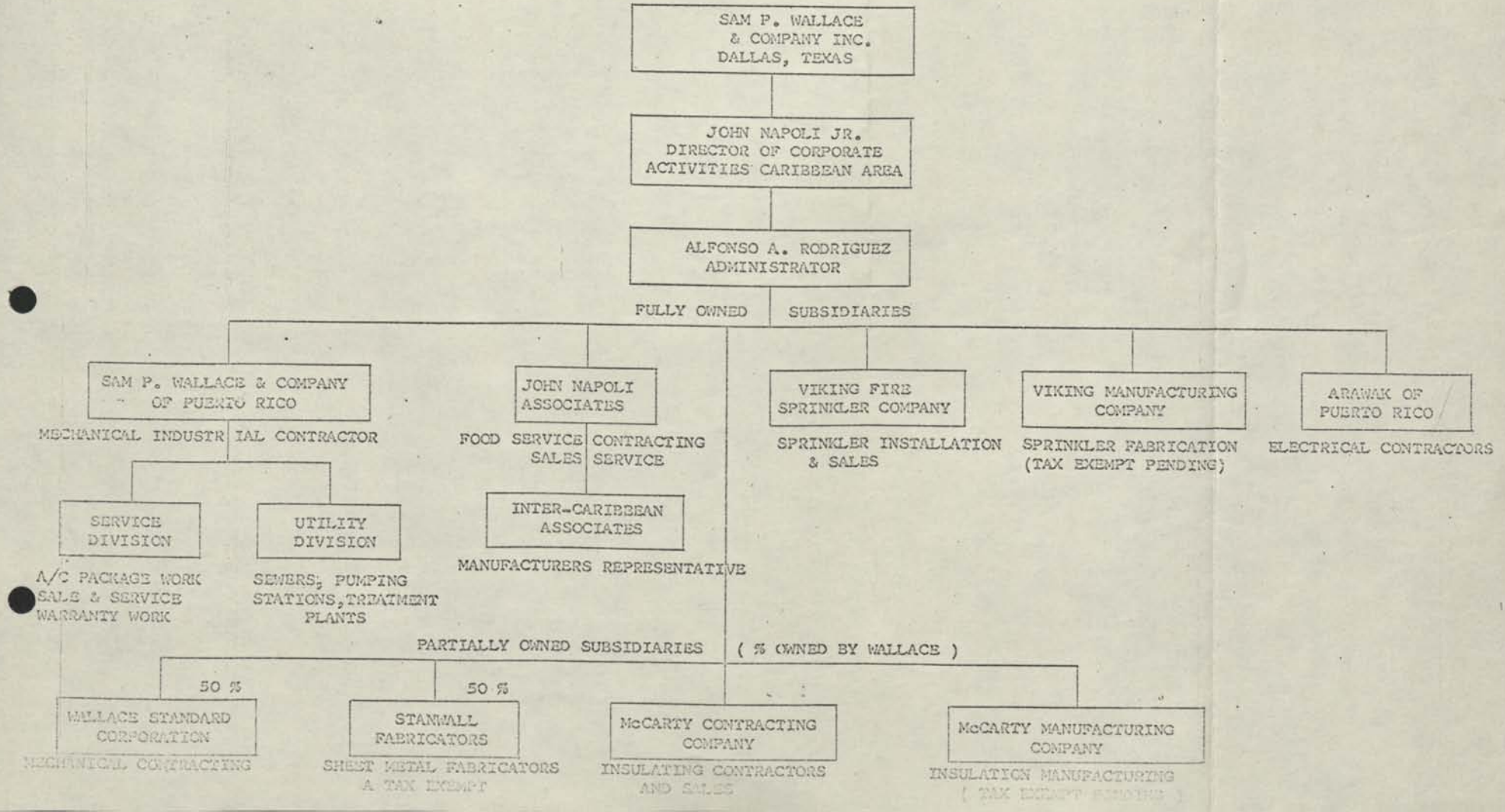
Juan A. Albelo	-	Manager Safety & Claims
Age	-	39
Education	-	UPR B. S.

Experience:

Rexach Construction Company

1969-1971 Manager Safety and Claims

SAM P. WALLACE COMPANIES IN PUERTO RICO



SAM P. WALLACE & COMPANY
OF PUERTO RICO, INC.

Sam P. Wallace & Company of P. R., Inc.
Project Organization

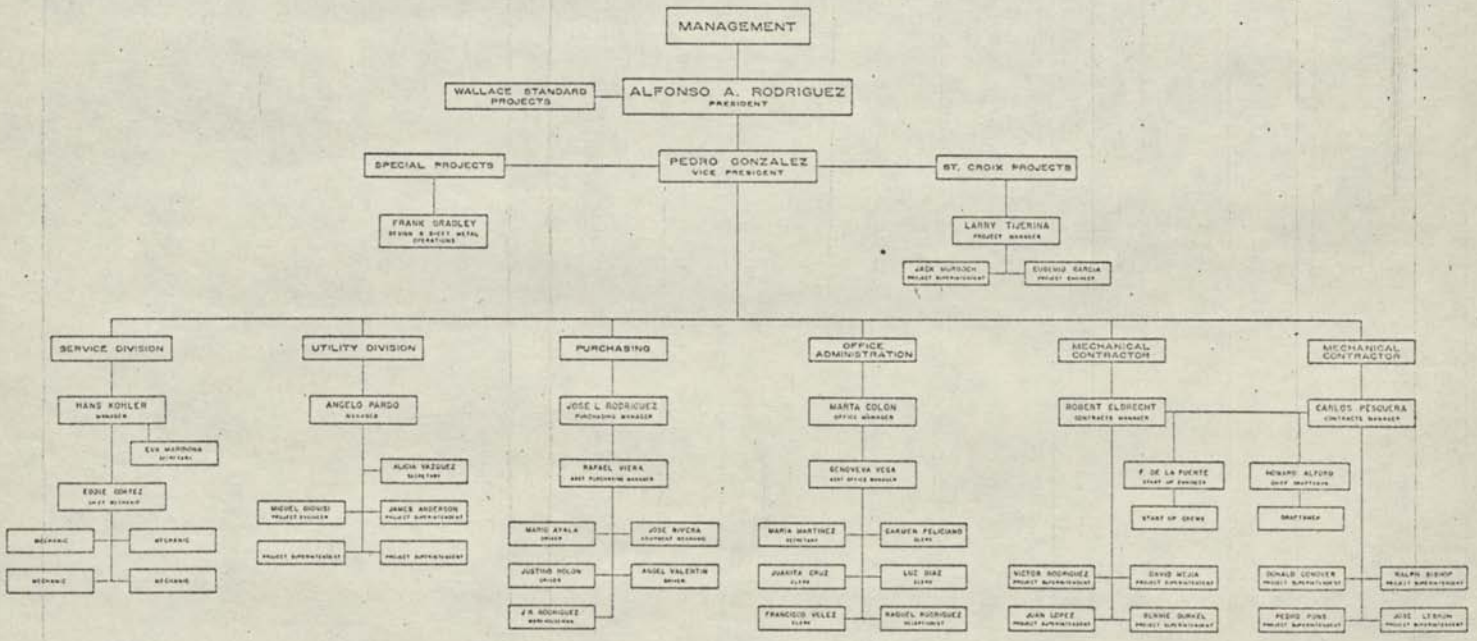
Our Project Organization depends on the kind and size of project.

Normally our Project Organization is as follows:

Operation Vice-President	-	Will oversee the project as the Corporate Officer.
Contract Manager	-	Has full responsibility for the project and will offer both technical and administrative support to the on-site organization
Project Superintendent	-	Has full responsibility for the on-site organization.
Project Engineer	-	Assistant to the Project Superintendent
Piping Foremen	-	Self Explanatory
Equipment Erection Foremen	-	Self Explanatory
Plumbing Foremen	-	Self Explanatory
Insulation Foremen	-	Self Explanatory
Instrumentation Foremen	-	Self Explanatory
Warehousemen	-	Self Explanatory
Timekeeper	-	Self Explanatory
Clerk	-	Self Explanatory

SAM P. WALLACE CO., INC.

SAM P. WALLACE & CO. OF PUERTO RICO, INC.



SAM P. WALLACE & COMPANY
OF PUERTO RICO, INC.

Sam P. Wallace & Company of P. R., Inc.
Information Sheet
Executive Staff

President - Alfonso A. Rodriguez - Age 46
2 years attended the University of Houston
26 years in Mechanical/Industrial Construction

Vice-President - Pedro G. Gonzalez - Age: 45
3 years Texas A & M

Enviromental Control
Division Manager - Angelo Pardo - Age:
Civil Engineer - University of Colorado

Senior Staff Engineer - Robert L. Elbrecht - Age 41
Mechanical Engineer - University of Menphis

Contract Manager - Carlos A. Pesquera - Age: 31
Mechanical Engineer - University of Puerto Rico

Contract Manager - Juan B. Lopez - Age: 52
Mechanical Engineer - University of Puerto Rico

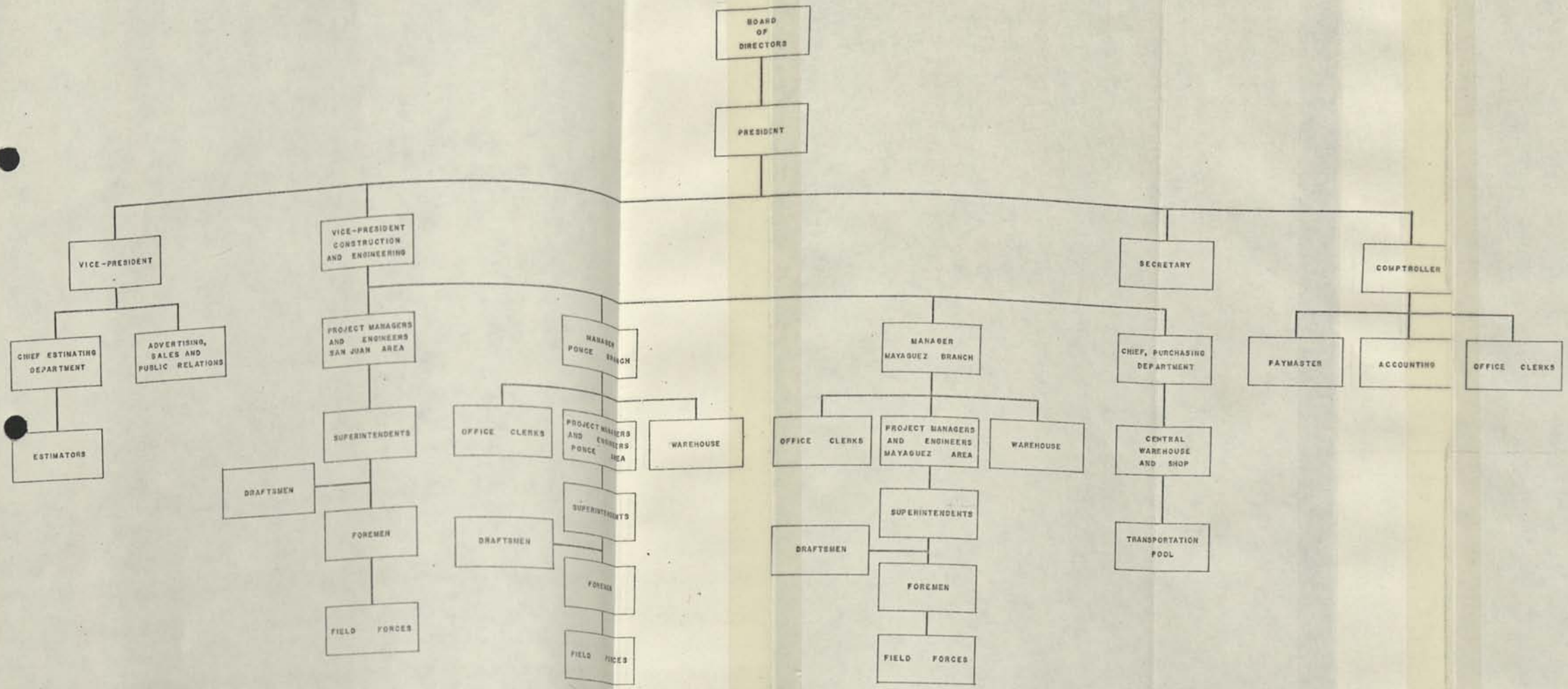
Contract Manager - Jose R. Lebron - Age: 47
Mechanical Engineer - University of Puerto Rico

Sheet Metal Operation - Frank Bradley - Age: 51
Mechanical Engineer - University of Prague

Service Division - Hans J. Kohler - Age: 43
Manager Naval Academy (Germany)

Staff Engineer -	Miguel Dionisi - Age: 28 Civil Engineer - University of Puerto Rico
Sprinkler Company -	Fausto C. Parreño Acosta - Age: 49 Mechanical Engineer - University of Havana
Insulation Company -	Dave Jackson - Age: 34 Mechanical Engineer - University of Louisiana State
Electrical Company -	Marcos Menendez Quiros - Age: 55 Electrical Engineer - University of Havana
Food Service Consultant & Contractors -	John Napoli, Jr. - Age: 55 Technical College
Controller -	Manuel Diaz Bergnes - Age: 38 Business Administration - University of Havana
Purchasing Manager -	Jose Luis Rodriguez - Age: 36 2 years City College of New York

LORD ELECTRIC COMPANY OF PUERTO RICO, INC.



FIELD MANAGEMENT TEAM

The functional field organization is depicted on the organization chart shown in this section. This organizational approach has been used extremely successfully by Lord Electric for many years.

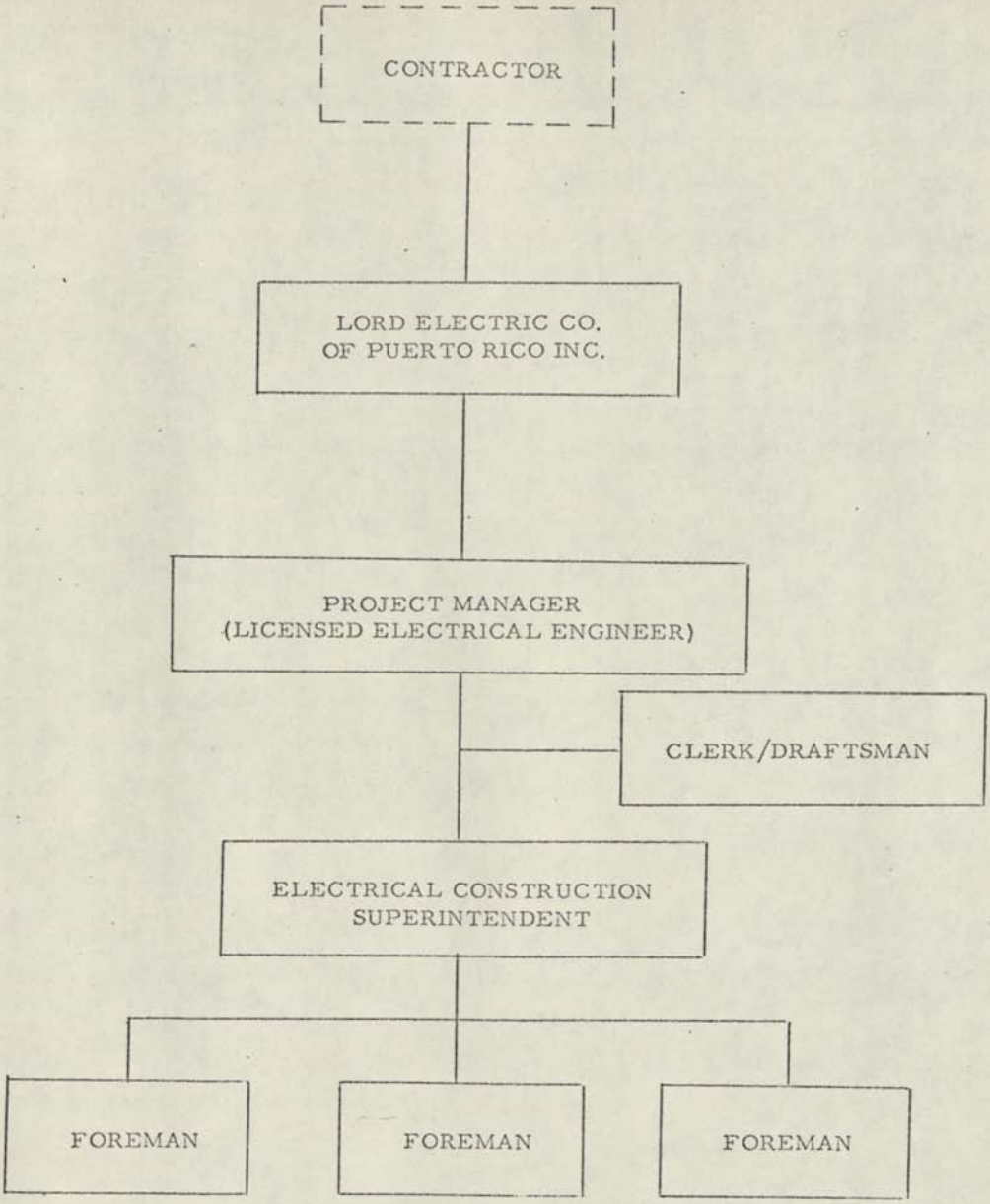
The centralized control of the entire project rests with the Project Manager who always is a locally registered electrical engineer. Should the Project Manager require home office support during any phase of construction, he will contact the Vice-President for Construction and Engineering.

The field management team acts as a self-contained unit fully capable of making on-the-spot top level decisions in behalf of Lord Electric Co.

The Project Manager will coordinate all aspects of construction and engineering right from his field office at the jobsite.

The project's purchasing and accounting functions are handled on a centralized basis by our Main Office. This insures greater savings to the Owner by consolidating purchases and administrative functions.

Warehousing responsibility rests with the Project Manager at the jobsite. He will have a clerk responsible for supervising the receipt of materials purchased or supplied for the work and for its proper storage and issue at the project site. This person is responsible for initiating receiving and inspection reports and maintains control over all items warehoused and disbursed through appropiate inventory records.


CONTRACTOR
LORD ELECTRIC CO.
OF PUERTO RICO INC.
PROJECT MANAGER
(LICENSED ELECTRICAL ENGINEER)
CLERK/DRAFTSMAN
ELECTRICAL CONSTRUCTION
SUPERINTENDENT
FOREMAN
FOREMAN
FOREMAN

LIST OF KEY PERSONNEL

President
Rubén Vélez Lebrón, M.E., P.E.

Vice-President, Construction and Engineering
Juan F. García, E.E., P.E.

Vice-President
Roberto Gorbea, E.E., P.E.

Manager Ponce Office
Eleazar Rivera, E.E., P.E.

Manager Mayaguez Office
Luis Falto, E.E., P.E.

Comptroller
Avelino Vicente, B.B.A.

Head Estimating Department
Pedro Fernández, E.E., P.E.

Head Purchasing Department
Federico Bengoa, E.E., P.E.

Project Managers
Luis R. Paraliticci, E.E., P.E.
Enrique Gorbea, E.E., P.E.
Juan R. López, E.E., M.S., P.E.
Eduardo Rivera del Moral, E.E., P.E.
Eugenio Mulero, E.E., P.E.
Edgar Muñiz, E.E., P.E.
Ricardo Capriles, E.E., P.E.
Emilio Pou, E.E., P.E.
José Hudo, E.E., P.E.
H. Richard Case

Present salary range for Project Managers is $11,000 to $15,000 per year.

RESUME

TITLE	President, Lord Electric Co. of P. R. Inc. Member of Board of Directors - Lord Electric Co. of P. R. Inc.
NAME	Rubén Vélez Lebrón
DATE OF BIRTH	January 23, 1929
EDUCATION	BSME, Magna Cum Laude, College of Engineering University of Puerto Rico - 1950 Graduate Studies at University of California, Berkeley - 1951 Registered Professional Engineer - Puerto Rico
MEMBER	Institute of Engineers, Architects and Land Surveyors of Puerto Rico Institute of Electrical Engineers of Puerto Rico Institute of Mechanical Engineers of Puerto Rico Puerto Rico Electrical Contractors Association Puerto Rico Manufacturers Association Chamber of Commerce of Puerto Rico Homebuilders Association of Puerto Rico The Associated General Contractors of America Board of Trustees, Presbyterian Community Hospital

PROFESSIONAL EXPERIENCE:

1967 - Present	President of Lord Electric Co. of P. R. Inc.
1959 - 1967	Vice-President and General Manager - Lord Electric Co. of P. R. Inc.
1957 - 1959	President - Electrical Engineering & Construction Corp., electrical contractors, San Juan, P. R.
1952 - 1957	Head of the Division of Industrial Facilities - Puerto Rico Department of Agriculture & Commerce, San Juan, P. R.

RESUME

TITLE	Vice-President, Construction & Engineering of Lord Electric Co. of P. R. Inc.
NAME	Juan F. García
DATE OF BIRTH	August 20, 1937
EDUCATION	BSEE, University of Puerto Rico - 1959 U. S. Air Force Radar Training School - 1960 Registered Professional Engineer - Puerto Rico
MEMBER	Institute of Engineers, Architects and Land Surveyors of Puerto Rico Institute of Electrical Engineers of Puerto Rico Chamber of Commerce of Puerto Rico Puerto Rico Electrical Contractors Asso. - President Homebuilders Society of Puerto Rico The Associated General Contractors of America Puerto Rico Manufacturers Association Institute of Electrical and Electronics Engineers

PROFESSIONAL EXPERIENCE:

1968 - Present	Vice-President, Construction & Engineering - Lord Electric Co. of P. R. Inc.
1960 - 1968	Project Manager, Chief of Estimating Department, Chief of Construction Department - Lord Electric Co. of P. R. Inc.
1959 - 1960	U. S. Air Force
1959	Project Engineer - Solé Electrical Contractors, Inc.

RESUME

TITLE	Vice-President - Lord Electric Co. of P. R. Inc.
NAME	Roberto Gorbea
DATE OF BIRTH	June 7, 1941
EDUCATION	BSEE, Virginia Military Institute - 1962 Registered Professional Engineer - Puerto Rico and State of Virginia
MEMBER	Institute of Engineers, Architects and Land Surveyors of Puerto Rico Institute of Electrical Engineers of Puerto Rico - Vice-President Chamber of Commerce of Puerto Rico Puerto Rico Electrical Contractors Association Homebuilders Society of Puerto Rico The Associated General Contractors of America Puerto Rico Manufacturers Association

PROFESSIONAL EXPERIENCE:

1968 - Present	Vice-President - Lord Electric Co. of P. R. Inc.
1965 - 1968	Project Manager and field supervisor of major electrical construction projects - Lord Electric Co. of P. R. Inc.
1963 - 1965	U. S. Army Officer - Ordnance Corps.
1962 - 1963	Electrical design engineer - Puerto Rico Urban Renewal & Housing Corp.

RESUME

TITLE	Manager, Ponce Office
NAME	Eleazar Rivera
DATE OF BIRTH	March 28, 1941
EDUCATION	BSEE, University of Puerto Rico - 1964 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1970 - Present	Manager, Ponce Office - Lord Electric Co. of P. R. Inc.
1965 - 1970	Project Manager - Lord Electric Co. of P. R. Inc.
1964 - 1965	Project Engineer, Estimating Engineer - Reyes & Ramos, Inc.

RESUME

TITLE	Manager, Mayaguez Office
NAME	Luis Falto
DATE OF BIRTH	July 19, 1938
EDUCATION	BSEE, University of Puerto Rico - 1960 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1966 - Present	Manager, Mayaguez Office - Lord Electric Co. of P. R. Inc.
1964 - 1966	Project Manager - Lord Electric Co. of P. R. Inc.
1963 - 1964	Vice-President - Aponte Construction Corp.
1961 - 1963	Electrical Design Engineer - P. R. Water Resources Authority
1960 - 1961	Line Supervisor, rural electrification systems - P. R. Water Resources Authority

RESUME

TITLE	Head, Estimating Department
NAME	Pedro J. Fernández
DATE OF BIRTH	January 20, 1938
EDUCATION	BSEE, University of Puerto Rico, 1963 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1968 - Present	Head, Estimating Department - Lord Electric Co. of P. R. Inc.
1965 - 1968	Estimating Engineer - Lord Electric Co. of P. R. Inc.
1963 - 1965	Project Manager and Field Engineer - Lord Electric Co. of P. R. Inc.

RESUME

TITLE	Purchasing Engineer
NAME	Federico G. Bengoa
DATE OF BIRTH	April 24, 1942
EDUCATION	BSEE, University of Puerto Rico - 1965 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1968 - Present	Purchasing Engineer - Lord Electric Co. of P. R. Inc.
1965 - 1968	Project Engineer - Bengoa Electric Inc.

RESUME

TITLE	Project Manager
NAME	Luis R. Paraliticci
DATE OF BIRTH	August 3, 1942
EDUCATION	BSEE, University of Puerto Rico - 1965 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1966 - Present	Project Manager - Lord Electric Co. of P. R. Inc.
1965 - 1966	Estimating Engineer - Lord Electric Co. of P. R. Inc.

RESUME

TITLE	Project Manager
NAME	Enrique Gorbea, Jr.
DATE OF BIRTH	July 8, 1939
EDUCATION	BSEE, Virginia Military Institute - 1960 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1966 - Present	Project Manager - Lord Electric Co. of P. R. Inc.
1964 - 1966	Sales Engineer - Aluminum Extrusion Corp.
1961 - 1964	U. S. Army Officer - Ordnance Corps.
1960 - 1961	Project Engineer and Estimating Engineer - Sole Electrical Construction Co.

RESUME

TITLE	Project Manager
NAME	Juan R. López
DATE OF BIRTH	December 7, 1937
EDUCATION	BSEE, University of Puerto Rico - 1961 MSNT, University of Puerto Rico - 1963 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1968 - Present	Project Manager - Lord Electric Co. of P. R. Inc.
1963 - 1968	Officer, SigC, U. S. Army
1961 - 1962	Engineer - P. R. Telephone Co.

RESUME

TITLE	Project Manager
NAME	Eduardo Rivera del Moral
DATE OF BIRTH	October 28, 1941
EDUCATION	BSEE, University of Puerto Rico, 1964 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1966 - Present	Project Manager - Lord Electric Co. of P. R. Inc.
1964 - 1966	Project Engineer - Carrero & Tristani, Inc.

RESUME

TITLE	Project Manager
NAME	Eugenio Mulero Flores
DATE OF BIRTH	June 1, 1938
EDUCATION	BSEE, University of Puerto Rico - 1960 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1968 - Present	Project Manager - Lord Electric Co. of P. R. Inc.
1965 - 1968	Hydroelectrical Engineer - Puerto Rico Aqueduct & Sewer Authority
1963 - 1965	Electrical Design & Maintenance Engineer - Puerto Rico Ports Authority
1961 - 1963	Project Manager - Reyes & Ramos, Inc.
1960 - 1961	Termoelectric Plant Electric Design Engineer - Puerto Rico Water Resources Authority

RESUME

TITLE	Project Manager
NAME	Edgar M. Muñiz
DATE OF BIRTH	September 16, 1945
EDUCATION	BSEE, University of Puerto Rico - 1967 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1968 - Present	Project Manager - Lord Electric Co. of P. R. Inc.

RESUME

TITLE	Project Manager
NAME	Emilio J. Pou
DATE OF BIRTH	December 9, 1937
EDUCATION	BSEE, University of Puerto Rico - 1968 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1968 - Present	Project Manager - Lord Electric Co. of P. R. Inc.

RESUME

TITLE	Project Manager
NAME	José R. Hudo
DATE OF BIRTH	July 2, 1948
EDUCATION	BSEE, University of Puerto Rico - 1970 Registered Professional Engineer - Puerto Rico

PROFESSIONAL EXPERIENCE:

1970 - Present	Project Manager - Lord Electric Co. of P. R. Inc.

RESUME

TITLE	Project Manager
NAME	Homer Richard Case
DATE OF BIRTH	March 23, 1937
EDUCATION	One (1) year - University of Oklahoma

PROFESSIONAL EXPERIENCE:

1966 - Present	Project Manager, Project Engineer and field supervisor of major electrical construction projects - Lord Electric Co. of P. R. Inc.
1962 - 1966	Project Engineer for major electrical construction projects in the Northwest portion of the U. S. - Lord Electric Co., Inc.
1961 - 1962	Electrical Field Engineer - Superior Electric Co.
1960 - 1961	Electrical Draftsman - Superior Electric Co.

RUIZ, FONT, GONZALEZ & GARCIA

ARCHITECTS & ENGINEERS

CONSOLIDATING

VICTOR M. GARCIA ASSOCIATES

CONSULTING ENGINEERS

SCHIMMELPFENNIG, RUIZ & GONZALEZ

ARCHITECTS-ENGINEERS

GUILLERMO P. FONT & ASSOCIATES

ARCHITECTS

CONSULTANTS:

A.M. KINNEY, INC.	- INDUSTRIAL PROCESSES
HERNANDEZ & HERNANDEZ	- STRUCTURAL
JACA & SIERRA	- SOIL INVESTIGATIONS

RUIZ, FONT, GONZALEZ & GARCIA

A) Architects

Eloy Ruiz (Partner)	-	Lic. # 841
Guillermo P. Font (Partner)	-	Lic. # 3097
Gilberto González Seijo (Partner)	-	Lic. # 1002
Augusto F. Plard	-	Lic. # 1054
Aristides Arche (Architectural Designer)		

B) Engineers

1. Electrical

Victor M. Garcia (Partner)	-	Lic. # 908
Victor M. Negrón	-	Lic. # 4194
Alberto Rodríguez (Electric & Electronics Engineer)	-	Lic. # 4291
Ricardo Rodríguez	-	Lic. # 4465
Luis G. Hernaiz (Electrical Designer)		

2. Chemical

Manuel Fernández	-	Lic. # 4663

3. Sanitary

Manuel Fernández	-	Lic. # 4663

4. Mechanical

Juan O. Cepero	-	Lic. # 932
Heine Rivera	-	Lic. # 3021
José E. Custodio	-	Lic. # 4747
Edgardo Arroyo	-	Lic. # 4760

5. Civil

Fabriciano González Ríos	-	Lic. # 1075
Manuel Fernández	-	Lic. # 4663
Enrique Umpierre	-	Lic. # 4729

C) Draftsmen

Burton Proffitt

Rafael López de Jesús

Aristides Orta

Horacio Velázquez

Rafael Silvestrini

Neftalí del Valle

Luis Acosta

Ernesto Nieves

D) Administrative Employees

1. Administrative Assistant

Graciela Prieto

2. Secretaries

Carlota Ruiz

Josefina Stofko

Myrna Soltero

Esther Becerra

FINANCIAL

On the following pages will be found copies of the most recent financial statements of the team members together with a list of banking references.

BANKING REFERENCES

Transfer Agent

The Chase Manhattan Bank, N. A.
One Chase Manhattan Plaza
New York, New Yor

and

Muñoz Rivera Corner Bolivia Street
Hato Rey, Puerto Rico

Registrar

First National City Bank of New York
55 Wall Street
New York, New York

and

Ponce de León Avenue
Hato Rey, Puerto Rico

Auditors

Touche Ross & Co.
1600 Ponce de León Avenue
Santurce, Puerto Rico

FINANCIAL STATEMENTS

GO HERE

CONSTRUCTION EQUIPMENT

Rexach Construction Company owns over three hundred pieces of major equipment used in constructing industrial plants, commercial buildings, expressways, marine work, runways and housing projects. This agrees with the proven opinion that a contractor must own a large share of the equipment necessary to perform the work. This results in savings to the client and at the same time provides flexibility when necessary. With the equipment available on the Island, the client does not pay for transportation from the States and return.

The Equipment Division is under the direction of a Vice President. Rexach maintains a permanent repair and maintenance facility, considered the finest of its kind in the Caribbean, in Guaynabo. It is staffed with skilled master mechanics who see to it that the right equipment is in the right place at the right time.

Preventive maintenance, programmed with scheduled replacement and a stock of long lead spare parts, plays an important role in the success achieved by the Equipment Division.

Some of the major owned equipment includes:

29 Bulldozers

21 Front end loaders

12 Crane on crawlers (includes manitowok 3900)

6 Mobile cranes

12 Gradalls

12 Graders

4 Carryalls

12 EUC Scrapers

20 Rollers

19 Air Compressors

100 Trucks

70 Pickups

Rental rates for Company owned equipment are stipulated in the proposal section.

WORK PERFORMED BY REXACH FORCES

Throughout its years of existence as the Leading Puerto Rican Contractor, Rexach has been required to perform all building functions. Consequently, it has maintained the capability to perform all of the basic work. If, however, a subcontract proposal is received on fee work that is responsible; represents a savings to the owner and has be approval of owner; then, the work may be sobcontracted.

The following items of work may normally be done by own forces:

Layout

Site Clearing and Preparation

Site Utilities

Excavation and Backfill

Reinforcing Steel

Forms and Reinforced Concrete

Structural Steel and Paction

Metal Decking and Siding

Pre-Cast Erection

Hollow Metal Installation

Carpentry and Millwork Installation

Masonry

Plastering

Marble

Quarry and Ceramic Tile

Cement Floor Finishes

Window and Hardware Installation

Toilet Partition and Accessory Installation

Miscellaneous Finish Work

Equipment Installation

The following work would in all probability be subcontracted, but Rexach shall maintain the capability to perform the work if more advantageous to the client.

Pile Foundations

Acoustic Plaster

Movable Partitions

Waterproofing

Resilient Flooring

Painting

It would be contemplated that the following work would be subcontracted.

Roofing

Vertical Transportation

Glass and Glazing

Store Front

Miscellaneous Specialty Items

The following work would be performed by Lord Electric and Wallace as members of the team.

Electrical

Plumbing and Process Piping

Air Conditioning

Water and Power Distribution and Industrial Waste Disposal

Sprinkler Work

Sheetmetal Work

Food Service Equipment

Insulation

Equipment

PURCHASING

Purchasing is handled for each project at the project level by the Project Engineer. Expediting of local materials is handled by the job. Expediting of imported materials is handled by the job with the assistance of the General Office and the stateside facilities of our team members.

ENGINEERING AND ESTIMATING

Rexach performs all Estimating and Budgeting Functions, at its General Office under the Vice President, Engineering. The

staff is complete and has at its immediate disposal up to date processed construction cost information. In addition, Rexach maintains comprehensive historical cost file. The wide range of the Company's construction activity coupled with the fact that it operates in all areas of the Island, uniquely validate the cost information assembled and available for use on your project.

TECHNICAL RESOURCES

Many of our employees have been with us for over a decade. The experience gained by these long years in construction is invaluable; experience which varies not only in type of work but in scale as well. We are able to maintain this large reservoir of skilled and trained personnel in many categories for today's complete construction procedures by offering to these key employees many company's supported fringe benefits.

We are constantly looking for better and more economical ways of doing construction. We own and use the latest labor saving equipment.

Rexach operates in house IBM Electronic Data Processing Equipment. The equipment is utilized for payroll and accounting purposes in addition to cost control. Weekly and monthly labor and material cost reports are prepared from information supplied from the projects.

One of the vital new tools available to the Construction Industry is the Critical Path Method of Secheduling. Our EDP equipment is capable of providing up date print outs for our CPM. Rexach maintains a CPM staff to assist projects in this phase of their work.

Samples of the print outs, cost reports, etc. are available upo request. We also invite your inspection of our facilities.

SAFETY

Rexach is a safety conscious contractor and has the record to prove it. This phase of the operation is under the leadership of the Safety Director. He is assisted by two full-time engineers that split the Island into two areas. The Safety Engineers make regular inspections on each project to insure compliance with the Company's Comprehensive Safety Program.

LABOR

Rexach Construction Company has existing agreements with the AFL/CIO Carpenters Union and the Heavy Equipment Operators Union. These two agreements cover all trades used by Rexach.

During the tenure of these agreements Rexach has not experienced any major work stoppages as have the other contractors without these agreements. In addition, and of importance, is the fact that there has been no apparent after effect for firms whose facilities were constructed under these agreements as far as unionizing of production shops is concerned.

It is felt that the Agreements have resulted in a stabilizing effect on our labor situation and have been a factor assuring our supply when needed.

PARTIAL LIST OF CLIENTS

Texaco Puerto Rico, Inc.

Puerto Rican Cement Co.

P.P.G. Industries

General Cigar

Consolidated Cigar

Parke-Davis

Department of Health

Highway Authority

Chase Manhattan Bank

Banco de Ponce

Banco Popular

El San Juan Hotel

National Packing Co.

Commonwealth Oil Refining Company

Water Resources Authority

Aqueductsand Sewers Authority

Hamilton International Corporation

San Jorge Development

Puerto Rico Urban Renewal and Housing Corporation

Hospital Santo Asilo de Damas

PARTIAL LIST OF ARCHITECTS

Toro y Ferrer

TAMS

José F. de la Torre

O'Kelley, Méndez & Brunner

McClintock & Thun

Samuel Méndez Cuesta & Associates

Guillermety y Ortiz

Schimmelphenning, Ruig and González

Carrero, Avila & González

Rodríguez Benítez & Fracinetti

Henry Klumb

Passalacqua & Cía.

Pérez Marchand & Mark

F. Montilla & R. Látimer

Sacha-Thevaud & Jerome Chirco

Reed, Torres, Beauchamp & Marvel

Skidmore, Owens, Merril

Edward Barnes

PARTIAL LIST OF NEGOTIATED CONTRACTS

Cigar Plants (2)	Consolidated Cigar
Cigar Plants (2)	General Cigar
Partab Laboratory	Parke-Davis
Pharmaceutical Plant	Parke-Davis
Site Preparation	P.P.G. Industries
El Conquistador Hotel	El San Juan Hotel Corp.
Aguirre Steam Plant	Water Resources Authority
Foundations	San Jorge Development
Office Building	Chase Manhattan Bank
Office Building	Banco de Ponce
Cement Plant Foundation	Puerto Rican Cement Co.

SAM P. WALLACE & COMPANY
OF PUERTO RICO, INC.

EQUIPMENT LIST

2 Hydraulic Crane - 12 1/2 Ton Capacity

4 Backhoes (Diggers)

2 Winch Trucks

1 Front End Loader

1 D-6 Bulldozer

42 250 Amp. Electric Welding Machines

23 300 Amp. Gasoline Driven Welding Machines

26 Pipe Threading Machines Ridgid 535

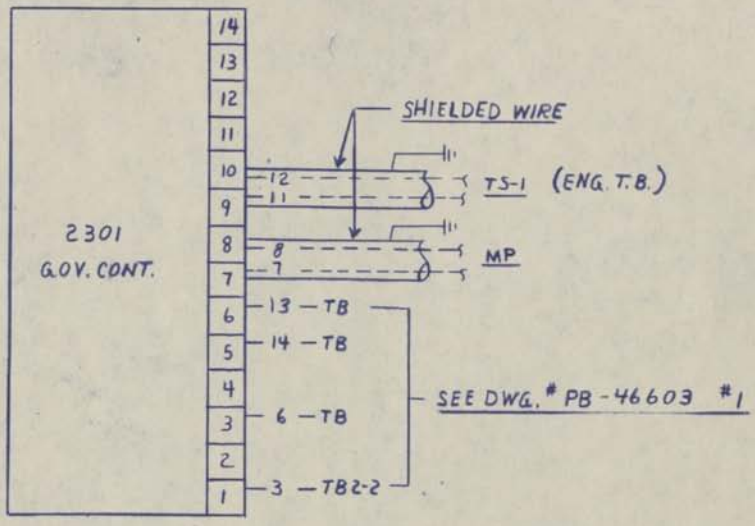
16 Ridgid 300 Power Drive

10 Ridgid 200 Power Drive

8 Ridgid 400 Power Drive

4 Heli-Arch Welding Machines

2 Micro Wire Welding Machines



AS BUILT
MAR 29 1972

DWG NO	REF DRAWINGS	NO	REVISIONS	BY	DATE

DWN. KHE DATE 2-21-72
RCD. CK

REPUBLIC ELECTRIC & DEVELOPMENT CO.
PEORIA, ILLINOIS

TITLE: WIRING - 2301 GOV. CONT.

DRAWING NO. PA-46603 #2

BILL OF MATERIAL

ITEM	QTY.	DESCRIPTION		CATALOG NO.	MFG
RR	1	Run Relay	24VDC 3PDT	105-4009	Milwaukee
CTR	1	Crank Term. Relay	24VDC 3PDT	105-4009	Milwaukee
ENFR	1	Eng. Fail. Relay	24VDC 3PDT	105-4009	Milwaukee
OPR	1	Oil Pressure Relay	24VDC 2PDT	105	Milwaukee
WTR	1	Water Temp. Relay	24VDC 2PDT	105	Milwaukee
OSR	1	Overspeed Relay	24VDC 2PDT	105	Milwaukee
OCR	1	Overcrank Relay	24VDC 2PDT	105	Milwaukee
CCT-1-2	2	Cycle Crank Timer	24VDC	TI-1925	Syracuse
IST	1	Eng. Idle Timer	24VDC	DLR-0-3-6-23	Syracuse
OCT	1	Overcrank Timer	24VDC	RO-120	G.V.
ACS	1	Control Switch	4 Pos.	101402A	ESCO
RE	1	Reset Switch	1P1T	8813K12	C.H.
OPL	1	Oil Press. Light	24VDC	51901-111	Dialco
WTL	1	Water Temp. Light	24VDC	51901-111	Dialco
OSL	1	Overspeed Light	24VDC	51901-111	Dialco
OCL	1	Overcrank Light	24VDC	51901-111	Dialco
	1	Socket (IST)	8-Pin	RS-8	Curtis
	5	Socket	8-Pin	RS-8	Curtis
	3	Socket	11-Pin	RS-11	Curtis
	1	Mounting Channel		(For Above)	Curtis
T.B.	2	Terminal Block	15 Point	15-140	C.J.
D1-2	2	Diode	1000PIV	HEP-170	Motorola
GOV	1	Governor (Freq. Unit)	2301	(Customer Supplied)	Woodward

AS BUILT
MAR 29 1972

DWG NO	REF DRAWINGS	NO	REVISIONS	BY	DATE

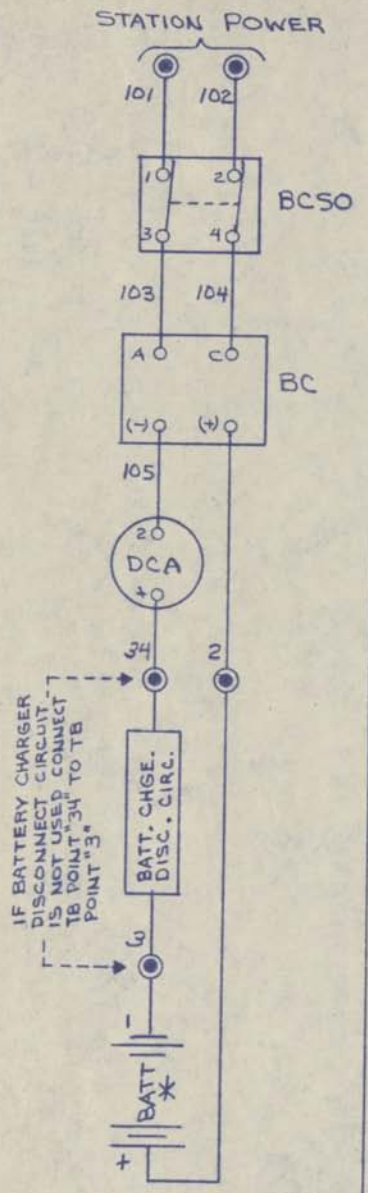
DWN. KHE | DATE 2-22-72
RCD. | CK.

REPUBLIC ELECTRIC & DEVELOPMENT CO.
PEORIA, ILLINOIS

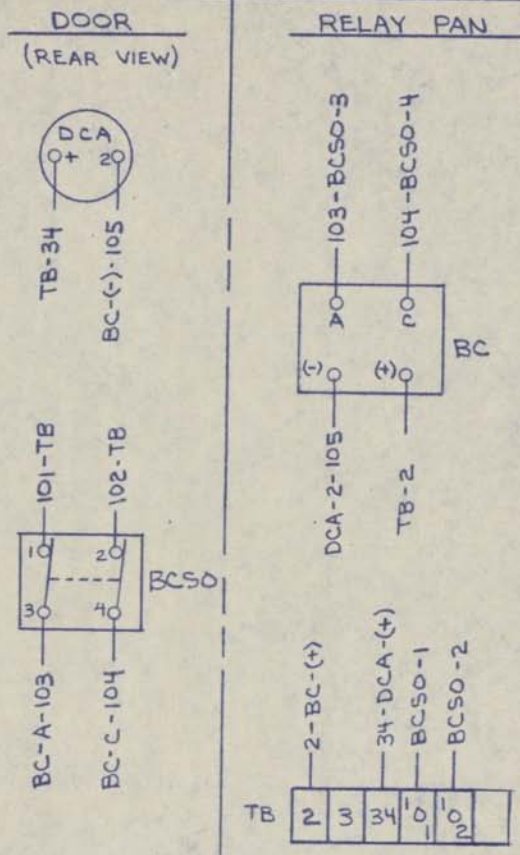
TITLE (C.T. Co. Eng. - Engine Control

DRAWING NO. PA-46604

SCHEMATIC



WIRING



ABBREVIATIONS

BATT – BATTERY
BC – BATTERY CHARGER
BCSO – BC SWITCH - OFF/ON
DCA – D.C. AMMETER
* – REMOTE MOUNTED OR SUPPLIED BY OTHERS
◉ – TERMINAL BOARD POINT

MAR 29 1972 AS BUILT

DWG NO	REF DRAWINGS	NO	REVISIONS	BY	DATE

DWN. TS | DATE 9-10-70
RCD. | CK.

REPUBLIC ELECTRIC & DEVELOPMENT CO. PEORIA, ILLINOIS

TITLE: SCHEMATIC & WIRING BATTERY CHARGER

DRAWING NO. PA-4498

BILL OF MATERIAL

ITEM	QTY.	DESCRIPTION	CATALOG NO.	MFG
BC	1	Battery Charger 4-Amp A-20 Less Enclosure & DCA	Type R - 24VDC 120VAC	LaMarche
DCA	1	DC-Ammeter 0-5A	50-162111LSLS	G.E.
BCSO	1	Battery Charger On-Off Switch 2P1T	7610K2	Cutler-Hammer
TB	1	Terminal Block 6-PT	141-6	Cinch-Jones

AS BUILT

MAR 29 1972

DWG NO	REF DRAWINGS	NO	REVISIONS	BY	DATE

DWN. | DATE

RCD. | CK.

REPUBLIC ELECTRIC & DEVELOPMENT CO.
PEORIA, ILLINOIS

TITLE: Battery Charger

DRAWING NO. PA-21914

STATICALLY REGULATED CONTROLLED RECTIFIER GENERATOR

563 KVA 450 KW 0.8 PF
1800 RPM 60 HZ 230-460 VOLTS 3 PHASE

CCW ROTATION FACING COLLECTOR END.
10 LEADS TO BE BROUGHT OUT AND IDENTIFIED ACCORDING TO WIRING DIAGRAM.

ROTOR TO BE MOUNTED ON SINGLE BALL BEARING.

WITH ADAPTER FOR D348 SERIES A ENGINE.
GENERATOR FRAME WILL BE STAMPED WITH VOLTAGE, SERIAL NUMBER, & C.T.CO. PART NUMBER. SERIAL NUMBER TO BE T450TH2000 AND UP.

GENERATOR IS TO BE PAINTED WITH ONE COAT OF PRIMER APPROVED BY C.T.CO.

CENTURY ELECTRIC CO. DIMENSION DRAWING NO. 403761
NAMEPLATE 2N9444 FOR THREE PHASE OPERATION TO BE STAMPED IN WITH THE DATA SHOWN FOR 8L41 ON LIST 2N6290

SHIP UNCONNECTED UNLESS INSTRUCTED ON E.S.O.

WHEN CONNECTING, INSULATE CONNECTIONS AND UNUSED LEADS WITH A WRAPPING OF VARNISHED CAMBRIC TAPE FOLLOWED BY A WRAPPING OF BLACK FRICTION TAPE.

THIS GENERATOR IS IDENTICAL WITH 8L41 EXCEPT FOR THE FOLLOWING REMOVALS AND ADDITIONS:

REMOVE: ADD:

THIS GENERATOR WILL BE DESIGNED FOR TROPICAL ENVIRONMENT. STATOR WINDING WILL BE IN PREGNATED WITH TWO DIPS OF 100% EPOXY. ROTOR AND STATOR END COILS WILL BE FURTHER TREATED WITH ASPHALT MODIFIED EPOXY. GENERATOR WILL BE TREATED WITH FUNGICIDE AS REQUIRED TO MEET MIL-V-173.

FOR LINE DRAWING SHOWING DIMENSIONS AND ALL OTHER SERVICEABLE PART NUMBERS SEE 8L41

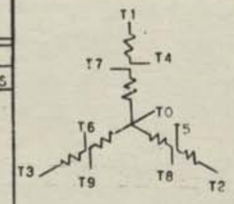
THE FOLLOWING KITS MAY BE USED TO MAKE SERVICE REPAIRS TO THIS GENERATOR:

1 - 2N6775 - KIT-STATOR REWIND
1 - 7L7405 - KIT-ROTOR BALANCE WEIGHT

NOTE: 3L SPECIFICATIONS ARE INDUSTRIAL DIVISION, ENGINEERING SERVICES, SPECIFICATIONS ONLY. FURTHER INFORMATION MAY BE OBTAINED FROM INDUSTRIAL DIVISION, ENGINEERING SERVICES, RECORD SECTION.

THREE PHASE CONNECTIONS
(GENERATOR FRAME SHOULD BE GROUNDED)

230 VOLTS		460 VOLTS	
CONNECT	LINE LEADS	CONNECT	LINE LEADS
T1-T7 T2-T8 T3-T9 T4-T5-T6-TO	T1-T7 T2-T8 T3-T9 NEUTRAL T4-T5-T6-TO	T4-T7 T5-T8 T6-T9	T1 T2 T3 NEUTRAL TO



WIRING DIAGRAM

3L97	PROCUREMENT SPEC. (SEE NOTE)
1E435	SERVICE BY C.T. CO.

HEAT TREATMENT

SOURCE:
CENTURY ELECTRIC CO.
SPEC. #

MATERIAL

CHG DATE

UNLESS OTHERWISE SPECIFIED
THIRD ANGLE PROJECTION
DIMENSIONS IN INCHES
3 PLACE DIM ± .010
2 PLACE DIM. ± .
ANGULAR DIM. ± 1°
SCALE =

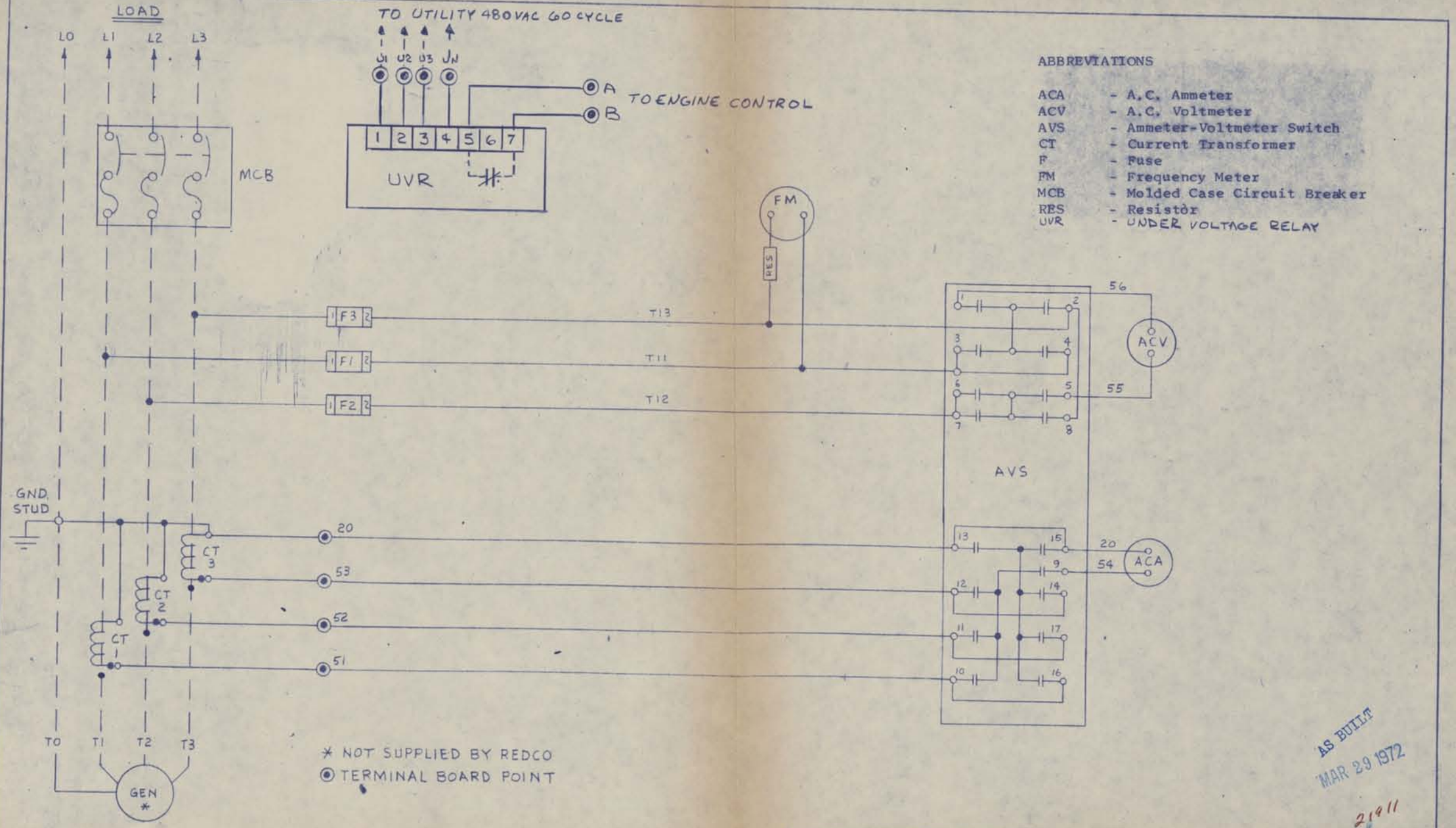
DATE JAN. 28, 197'
DRN L. STAHL
CHK C A [signature]
APPD. [signature]
PROVE DES | PROD.
ESO#EW 81352

CATERPILLAR

GENERATOR ASSEMBLY - 60 HZ
230-460 VOLTS

8L80

DES CONTROL K121



ABBREVIATIONS

ACA	- A.C. Ammeter
ACV	- A.C. Voltmeter
AVS	- Ammeter-Voltmeter Switch
CT	- Current Transformer
F	- Fuse
FM	- Frequency Meter
MCB	- Molded Case Circuit Breaker
RES	- Resistor
UVR	- UNDER VOLTAGE RELAY

* NOT SUPPLIED BY REDCO
◉ TERMINAL BOARD POINT

AS BUILT
MAR 29 1972

21911

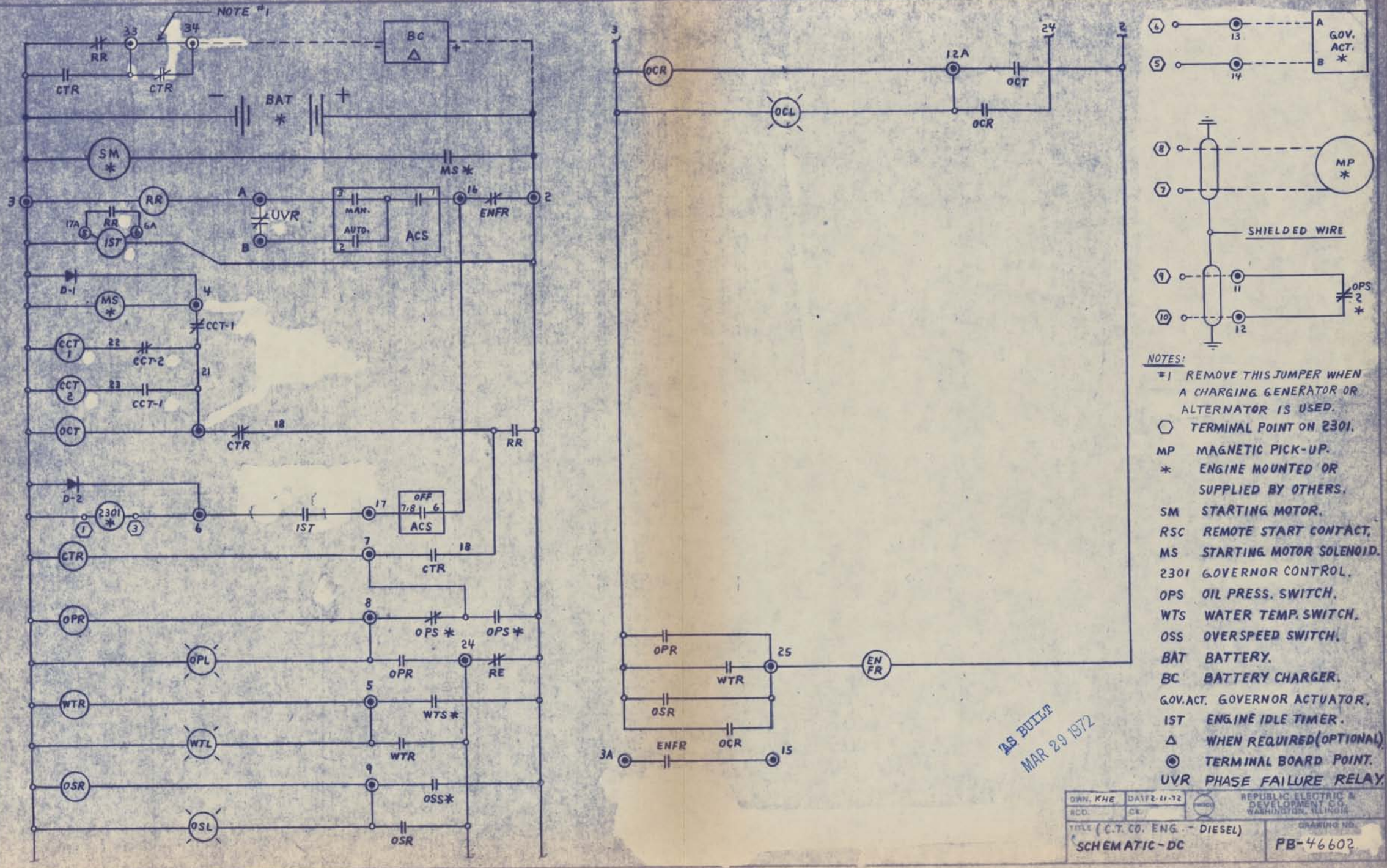
DWG NO	REF DRAWINGS	NO	REVISIONS	BY	DATE

DWN. IR DATE 6-12-70
RCD. CK. JK

REPUBLIC ELECTRIC & DEVELOPMENT CO.
PEORIA, ILLINOIS

TITLE
A.C. SCHEMATIC

DRAWING NO.
RR-2191



NOTES:

#1 REMOVE THIS JUMPER WHEN A CHARGING GENERATOR OR ALTERNATOR IS USED.

⬡ TERMINAL POINT ON 2301.

MP MAGNETIC PICK-UP.

* ENGINE MOUNTED OR SUPPLIED BY OTHERS.

SM STARTING MOTOR.

RSC REMOTE START CONTACT.

MS STARTING MOTOR SOLENOID.

2301 GOVERNOR CONTROL.

OPS OIL PRESS. SWITCH.

WTS WATER TEMP. SWITCH.

OSS OVERSPEED SWITCH.

BAT BATTERY.

BC BATTERY CHARGER.

GOV.ACT. GOVERNOR ACTUATOR.

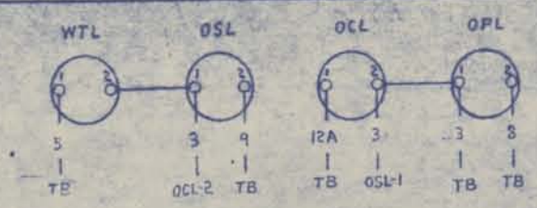
IST ENGINE IDLE TIMER.

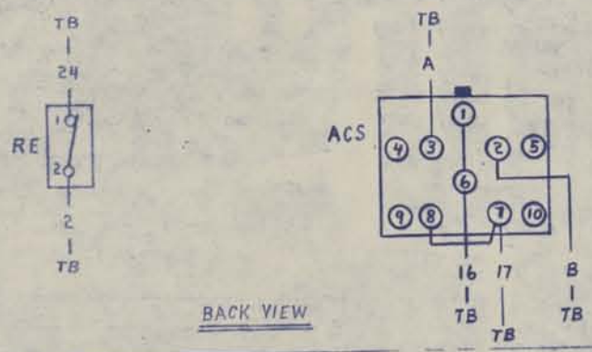
△ WHEN REQUIRED (OPTIONAL)

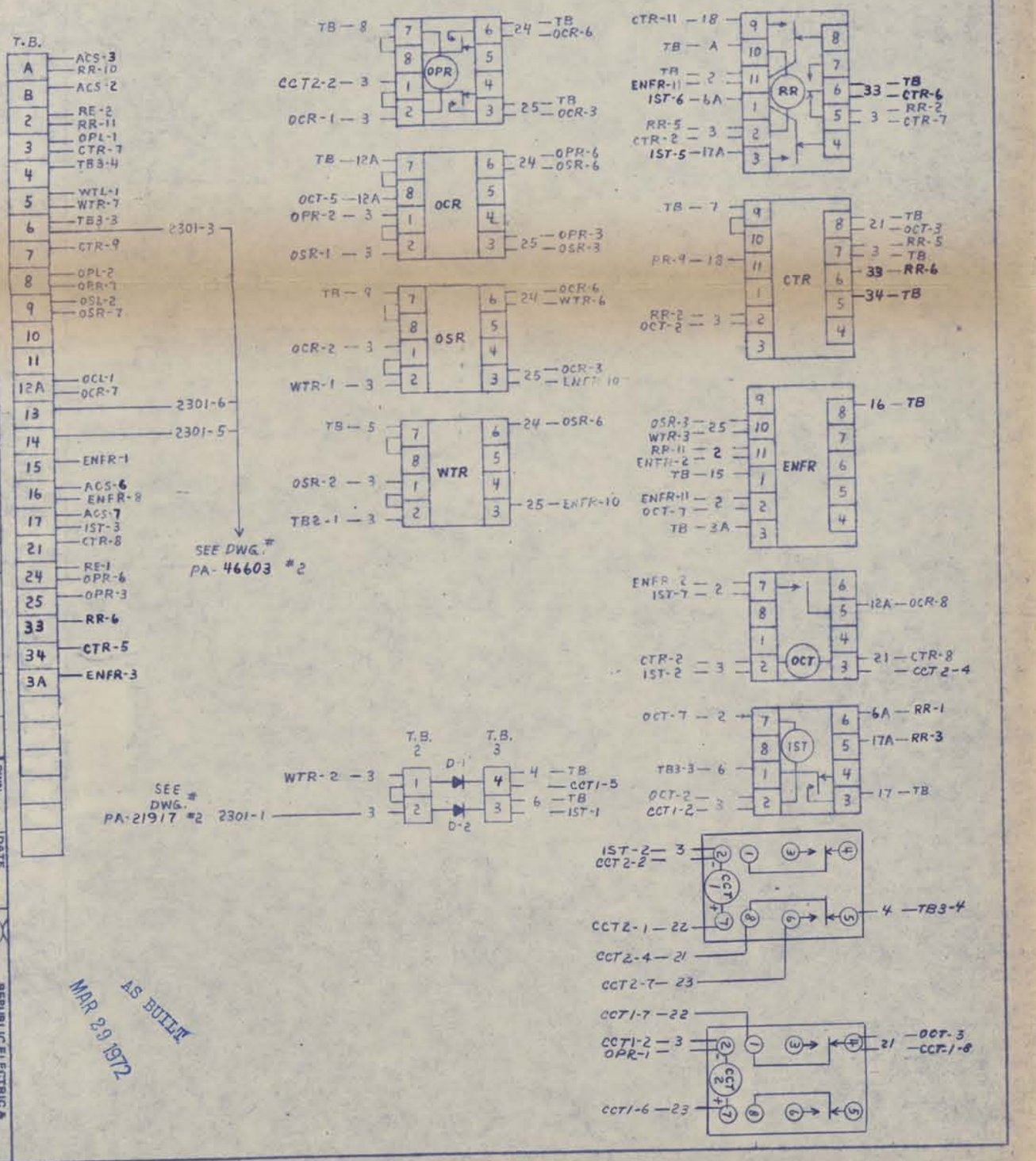
◉ TERMINAL BOARD POINT.

UVR PHASE FAILURE RELAY.

DWN. KHE	DATE 2-11-72	REPUBLIC ELECTRIC & DEVELOPMENT CO. WASHINGTON, ILLINOIS	
SCD.	CK.		
TITLE (C.T. CO. ENG. - DIESEL) SCHEMATIC-DC			DRAWING NO. PB-46602







DWG NO	REF DRAWINGS	NO	REVISIONS	BY	DATE

AS BUILT
MAR 29 1972

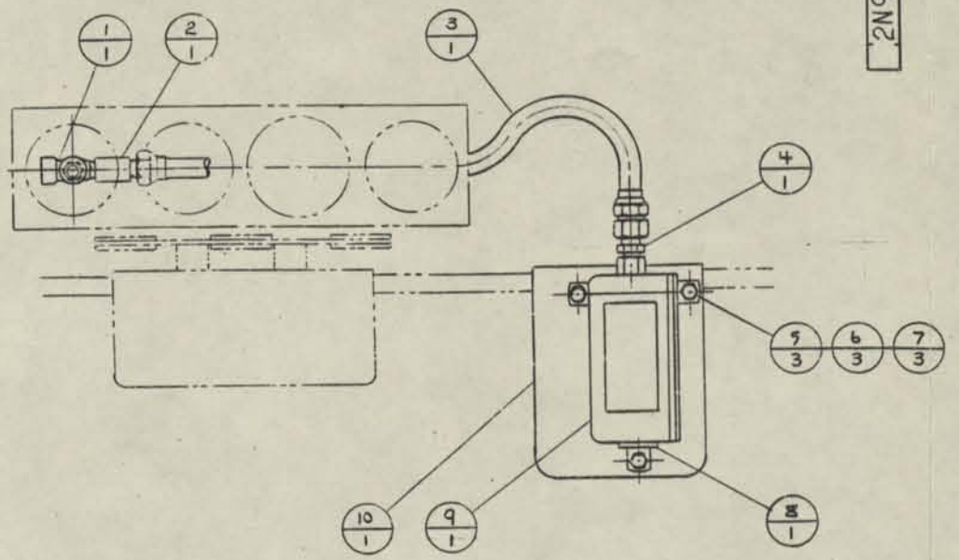
TITLE: WIRING - DC

DWN: KHF
RCD.
CK.
DATE: 2-21-72

REPUBLIC ELECTRIC & DEVELOPMENT CO. PEORIA, ILLINOIS

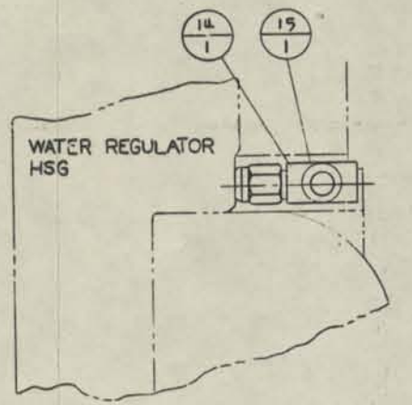
DRAWING NO. PB-46603 #1

2N9508



ITEM	QTY.	MEAS UNIT	PART NO.	NAME
1	1	-	1F9369	TEE
2	1	-	3B6487	COUPLING
3	1	-	3K3412	HOSE AS.
4	1	-	3B9400	FITTING
5	3	-	2A762	BOLT
6	3	-	3B4504	LOCKWASHER
7	3	-	1B4330	NUT
8	1	-	3F1240	GROMMET
9	1	-	2N7124	SWITCH
10	1	-	2N4036	BRACKET
14	1	-	7L6435	CONTACTOR
15	1	-	4F8184	BUSHING

①



①

REDUCED SIZE PRINT
EIGHTHS

2N9508

1E279	TIGHTENING
1E11	TOL

HEAT TREATMENT

MATERIAL

CHG	DATE
1	SEP 15, 70

UNLESS OTHERWISE SPECIFIED
THIRD ANGLE PROJECTION
DIMENSIONS IN INCHES
3 PLACE DIM. ± .010
2 PLACE DIM. ±
ANGULAR DIM. ± 1°
SCALE 1-2

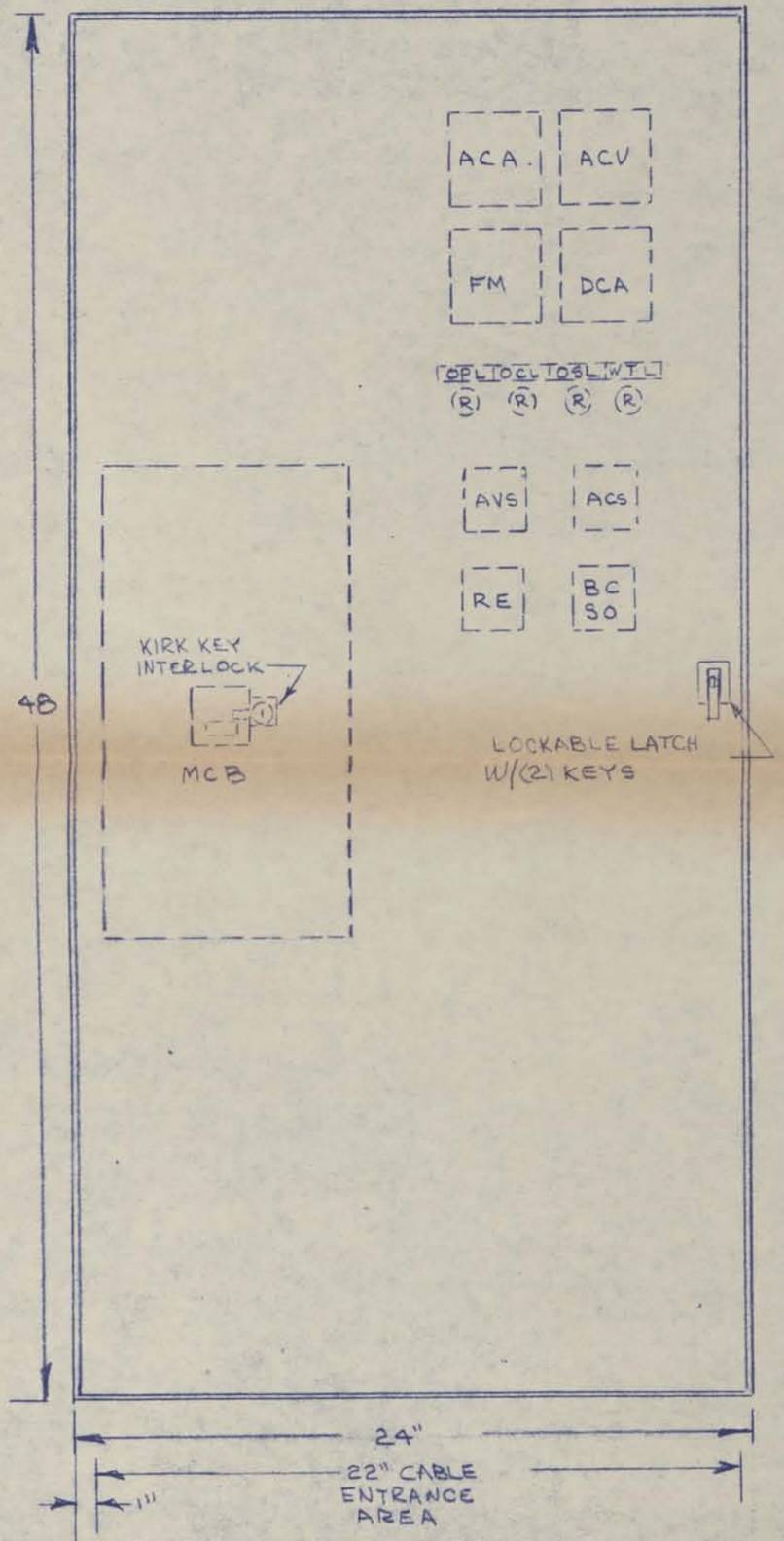
DATE JUN 23, 1970
DRN D. OLSON
CHK J.R. HERRON
APPD
PROVE DES | PROD. X

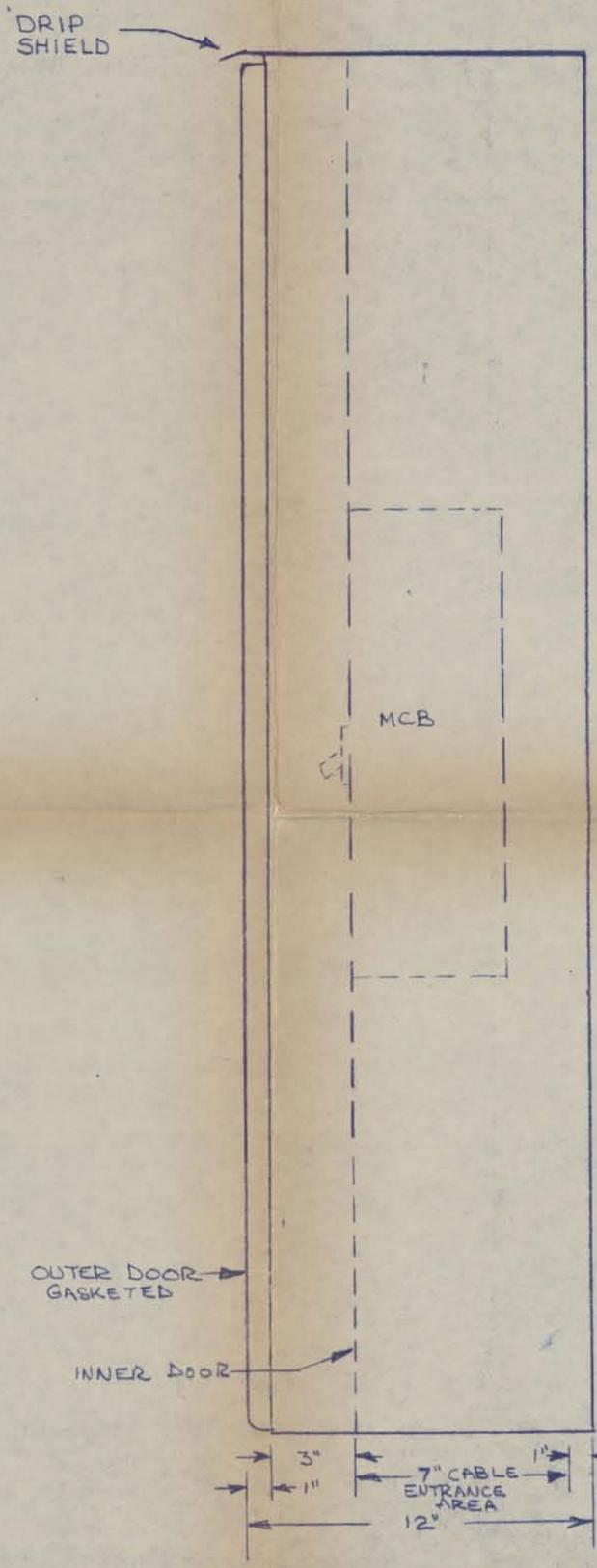
CATERPILLAR

CONTACTOR GROUP-ALARM (AUTOMATIC START-STOP)

2N9508

DES CONTROL K112





LEGEND

ACA - AC AMMETER
AVS - AMMETER-VOLTMETER SWITCH
ACV - AC VOLTMETER
DCA - DC AMMETER
BCSO - BATTERY CHARGER ON-OFF SWITCH
RE - FAULT RESET SWITCH
MCB - MOULDED CASE CIRCUIT BREAKER
OPL - OIL PRES FAULT LIGHT
OCL - OVERCRANK FAULT LIGHT
OSL - OVERSPEED LIGHT
WTL - WATER TEMP FAULT LIGHT

CONSTRUCTION NOTES

1. WEATHER PROOF CONSTRUCTION W/ DRIP SHIELD, FORMED 10 GA
2. OUTER DOOR, GASKETED, 10 GA SHEET METAL, HINGED LH SIDE
3. OUTER DOOR, LATCHED, LOCK W/(2) KEYS
4. INNER DOOR 10 GA. SHEET METAL, HINGED L.H. SIDE
5. MCB INTERLOCKED WITH KIRK KEY INTERLOCK
6. PAINT ASA 61, LT. GRAY

AS BUILT
MAR 29 1972

DWG. NO.	REFERENCE DRAWINGS	NO.	REVISIONS	BY	DATE

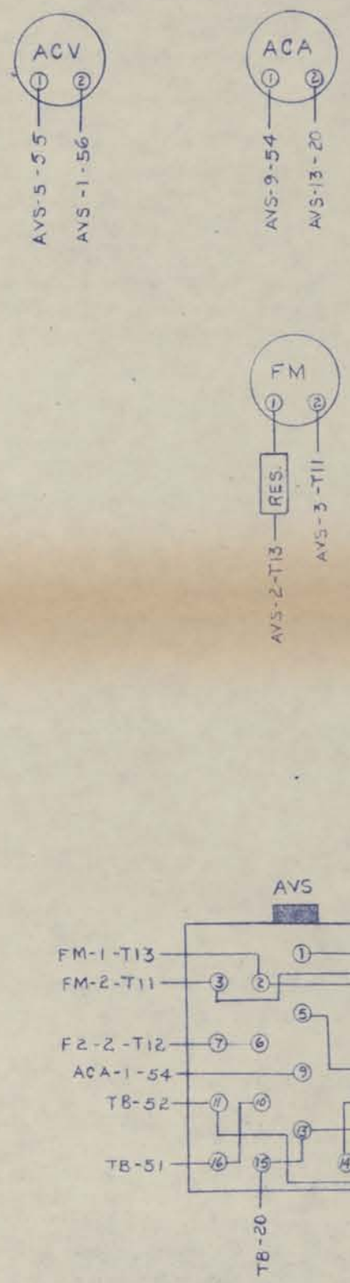
DRAWN IVAN
RECORDED
CHECKED JK
DATE 6-12-70
SCALE

REPUBLIC ELECTRIC & DEVELOPMENT CO.
PEORIA, ILLINOIS

TITLE: OUTLINE

DRAWING NO.: PC-21910

DOOR - REAR VIEW



MAR 29 1972 AS BUILT

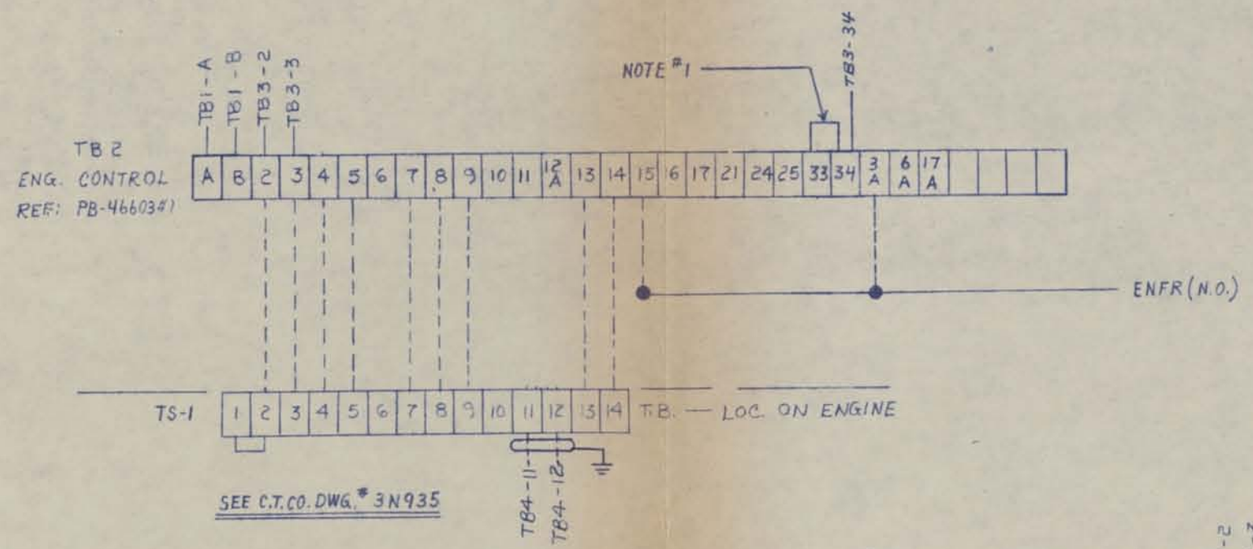
DWG. NO.	REFERENCE DRAWINGS	NO.	REVISIONS	BY	DATE

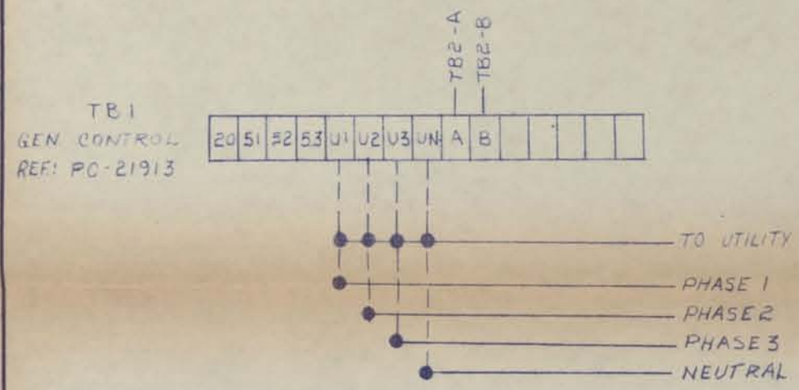
DRAWN GBM
DATE 6-18-70
RECORDED
CHECKED JK
SCALE NONE

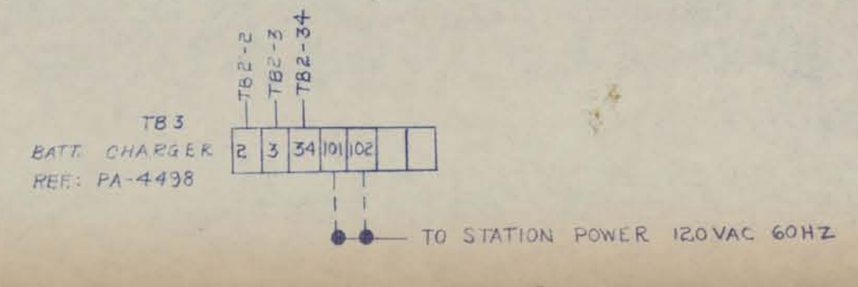
REPUBLIC ELECTRIC & DEVELOPMENT CO.
PEORIA, ILLINOIS

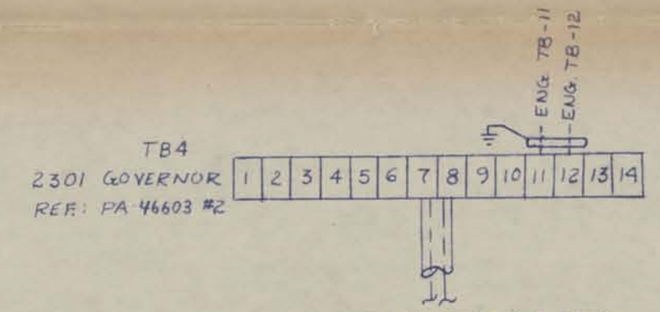
TITLE
WIRING - AC

DRAWING NO.
PC-21913









GEN. DATA:
565 KW
277/480V
3Ø 4WIRE
60 HZ
842 FLA
CT'S: 1000/5
PHASE ROTATION:
1-2-3

CONTROL VOLTAGE:
24 VDC

DIESEL ENGINE

REFERENCE DRAWINGS:

Outline	- PC-21910
Schematic - A.C.	- PB-21911
Wiring	- PC-21913
List of Materials	- PA-46601
Schematic D.C. & Gov. Cont.	- PB-46602
Wiring D.C.	- PB-46603 #1
Wiring Gov. Cont.	- PA-46603 #2
List of Materials	- PA-46604
Battery Charger Wiring & Schematic	- PA-4498
Battery Charger List of Materials	- PA-21914

————— Redco Wiring
- - - - - - - - - - Customer Wiring

NOTE #1 REMOVE THIS JUMPER WHEN A CHARGING GENERATOR OR ALTERNATOR IS USED.

AS BUILT

MAR 29 1972

DWG. NO.	REFERENCE DRAWINGS	NO.	REVISIONS	BY	DATE

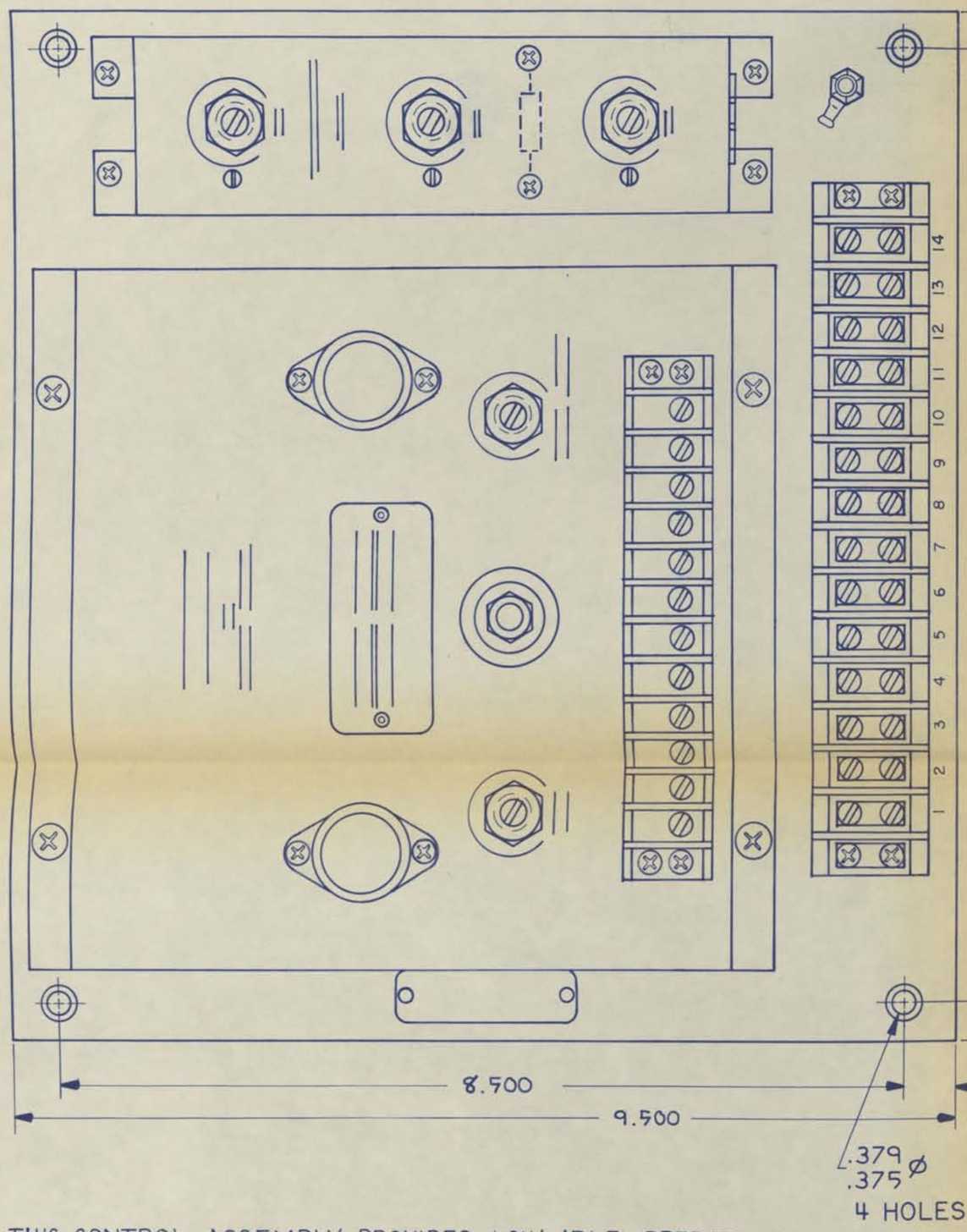
DRAWN KHE. DATE 2-21-72
RECORDED SCALE
CHECKED

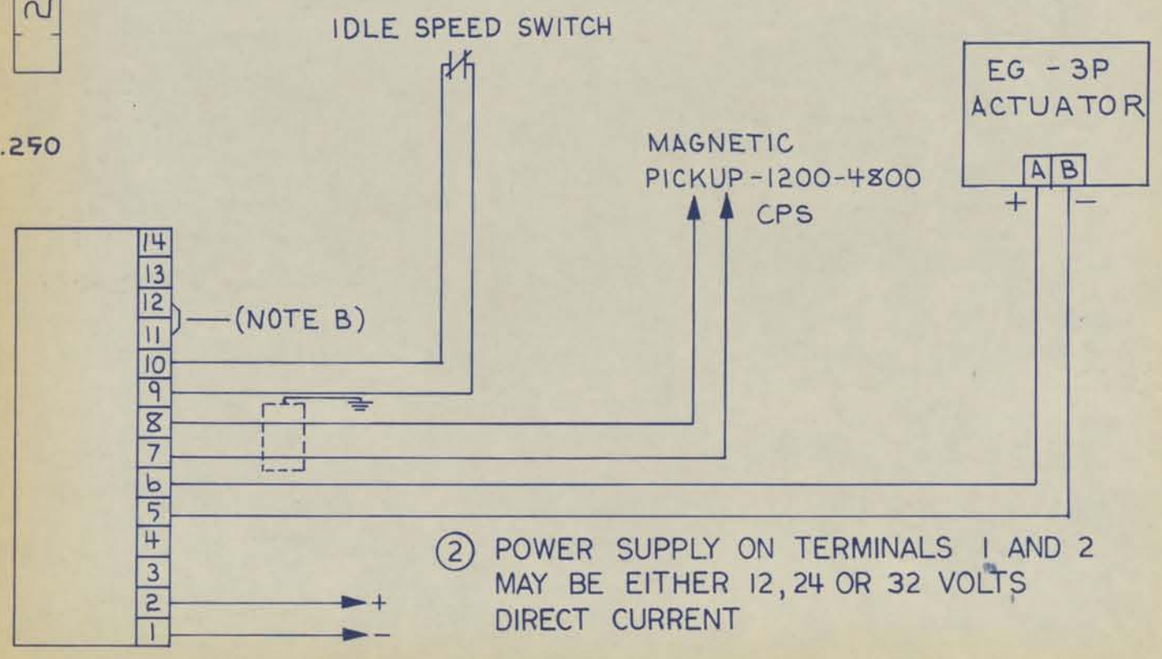
redco REPUBLIC ELECTRIC & DEVELOPMENT CO.
PEORIA, ILLINOIS

TITLE: INTERCONNECT

DRAWING NO.: PC-46605

W-3580





② POWER SUPPLY ON TERMINALS 1 AND 2 MAY BE EITHER 12, 24 OR 32 VOLTS DIRECT CURRENT

WIRING DIAGRAM

ADJUSTING PROCEDURE:

1. TURN ALL SPEED ADJUSTMENTS COUNTER CLOCKWISE
2. CLOSE IDLE SPEED SWITCH
3. TURN GAIN AND RESET DROOP POTENTIOMETERS TO MID POSITION
4. START ENGINE AND ADJUST LOW SPEED POTENTIOMETER TO SPECIFIED LOW IDLE
5. OPEN IDLE SPEED SWITCH
6. ADJUST HIGH SPEED AND FINE POTENTIOMETERS TO RATED SPEED

NOTE A: SOURCE: WOODWARD GOVERNOR CO. #8270-759 WOODWARD TYPE 2301 CONTROL FOR STANDBY ELECTRIC SETS. FOR USE WITH 12V, 24V OR 32V D.C. SUPPLY.

NOTE B: IF REMOTE SPEED CONTROL IS REQUIRED REMOVE JUMPER FROM TERMINALS 11 AND 12 OF GOVERNOR CONTROL AND WIRE POTENTIOMETER (250 OHM MAX) TO THESE TERMINALS WITH SHIELDED CABLE.

THIS CONTROL ASSEMBLY PROVIDES LOW IDLE OPERATION UNTIL SIGNALLED BY ENGINE MOUNTED OIL PRESSURE SWITCH. GOVERNOR CONTROL WILL THEN CAUSE ENGINE TO ACCELERATE AS A STEP TO ISOCHRONOUS SPEED.

LOSS OF POWER SUPPLY TO CONTROL ASSEMBLY CAUSES ACTUATOR TO GO TO MINIMUM FUEL.

LOSS OF SPEED SIGNAL FROM MAGNETIC PICKUP TO CONTROL ASSEMBLY CAUSES ACTUATOR TO GO TO MINIMUM FUEL.

2N9800

IE435 SERVICE BY SUPPLIER

HEAT TREATMENT

(NOTE A)

MATERIAL

CHG	DATE
2	SEP 13,71
1	JAN 12,71

UNLESS OTHERWISE SPECIFIED
THIRD ANGLE PROJECTION
DIMENSIONS IN INCHES
3 PLACE DIM. ±.010
2 PLACE DIM. ±.02
ANGULAR DIM. ± 1°
SCALE = NONE

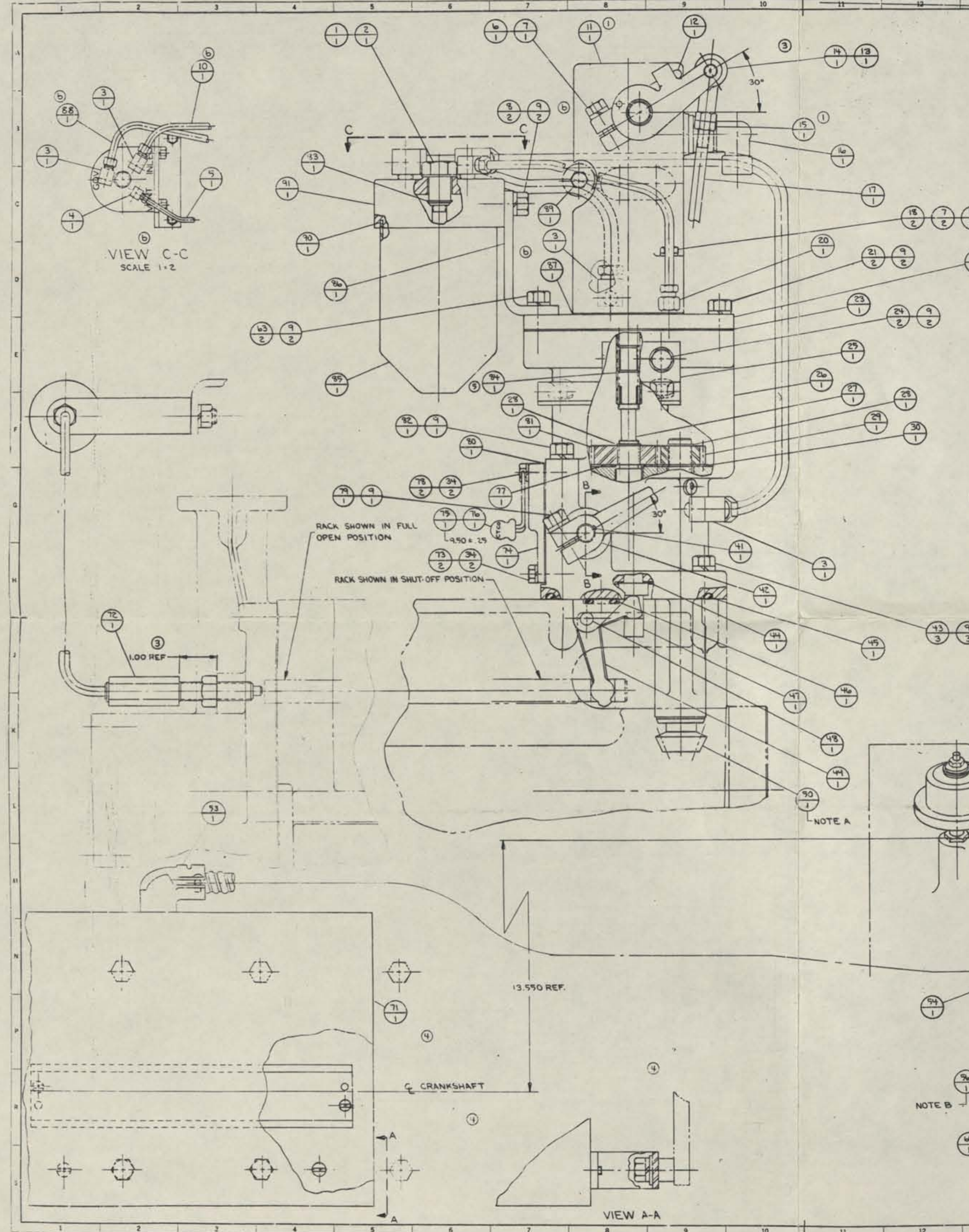
DATE JUL. 6, 1970
DRN A. BOOTH
CHK J. HEISEL
APPD. Spruce
PROVE DES PROD.

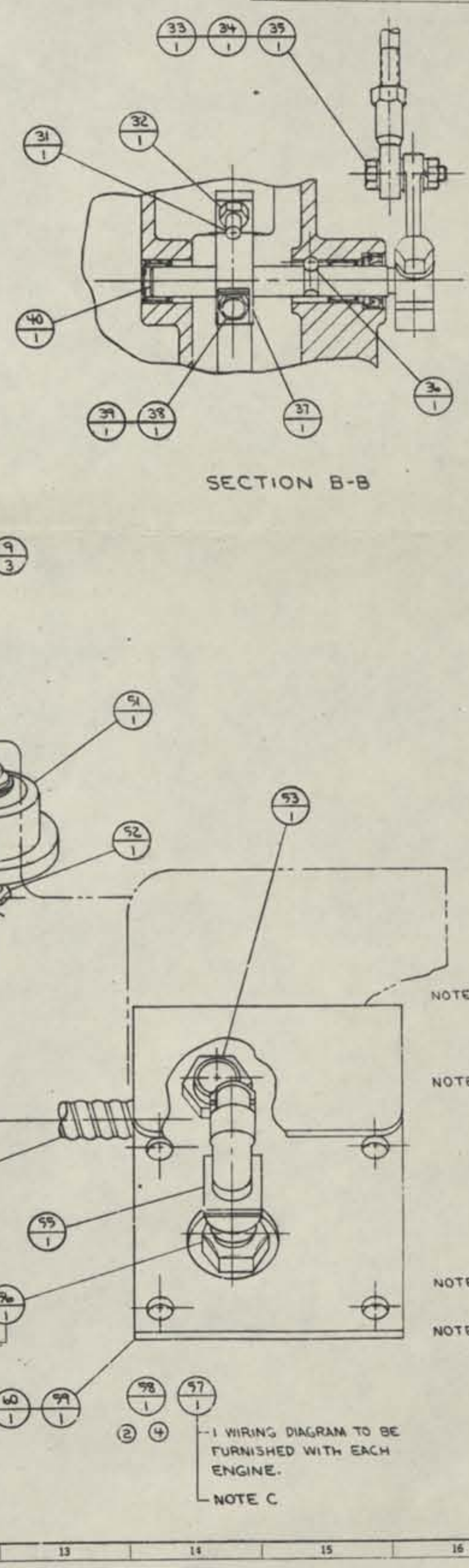
CATERPILLAR

CONTROL ASSEMBLY - GOVERNOR

2N9800

DES CONTROL K114





ITEM	QTY	MEAS UNIT	PART NO	NAME
71	1		3N857	JUNCTION BOX GROUP
72	1		2N6262	SHUT OFF GROUP
73	2		S1614	BOLT
74	1		1N8391	COVER
75	1		8S8158	SEAL
76	10	IN.	8S8160	WIRE
77	1		1S5923	WASHER
78	2		3R6569	BOLT
79	1		1A2029	BOLT
80	1		1N8390	GASKET
81	1		1N8423	GEAR
82	1		1A5964	BOLT
83	1		1L3769	RING
84	1		8L5855	COUPLING
85	1		8H2810	CASE AS.
86	1		1N7117	BRACKET
87	1		6L3528	GASKET
88	1		3N3214	TUBE AS.
89	1		5M6214	PLUG
90	1		3H2778	GASKET
91	1		7L2051	COVER AS.
92				
93				
94				
95				

2N9405

ITEM	QTY	MEAS UNIT	PART NO	NAME
[illegible]	1		9H2807	NUT
[illegible]	1		2A1162	GASKET
[illegible]	4		1L6939	FITTING
[illegible]	1		5K9243	ELBOW
[illegible]	1		2N9400	TUBE AS.
[illegible]	1		4B3988	BOLT
[illegible]	3		3B4505	LWASH
[illegible]	2		L1351	BOLT
[illegible]	3		3B4506	LWASH
[illegible]	1		3N3213	TUBE AS.
[illegible]	1		2N9045	ACTUATOR
[illegible]	1		2N9399	LEVER AS.
[illegible]	1		2R504	NUT
[illegible]	1		7H3641	ROD END
[illegible]	1		4F2294	NUT
[illegible]	1		8L8424	CONNECTOR
[illegible]	1		2N9403	ROD AS.
[illegible]	2		1N5946	STUD
[illegible]	2		1B4202	NUT
[illegible]	1		1M3265	FITTING
[illegible]	2		S1594	BOLT
[illegible]	1		5L9200	ADAPTER
[illegible]	1		6L3401	GASKET
[illegible]	2		S509	BOLT
[illegible]	1		2N7296	SUPPORT
[illegible]	1		1N9993	HSG. AS.
[illegible]	1		2N9404	SHAFT
[illegible]	2		2N8611	RING
[illegible]	1		1N8424	GEAR
[illegible]	1		2N8613	WASHER
[illegible]	1		5S9507	SCREW
[illegible]	1		5S9607	NUT
33	1		9F6980	BOLT
34	5		3B4504	LWASH
35	1		7H8909	NUT
36	1		8L4891	BOLT
[illegible]	1		1N9997	LEVER
[illegible]	1		2F4159	LOCK
[illegible]	1		1S219	BOLT
40	1		1N9998	SHAFT
41	1		1B8701	KEY
42	1		8L6334	LEVER
43	3		S1591	BOLT
44	1		2N9421	SPRING
45	1		9F7233	SEAL
46	1		1S7104	SEAL
47	1		2N8807	SHAFT AS.
48	1		1S7105	PIN
49	1		7S9352	LEVER
50	1		1N9992	PINION
51	1		1N5833	SWITCH
52	1		4M5317	BUSHING
53	2		5F1265	CONNECTOR
54	1		8B254	FLEXIBLE CONDUIT
55	1		8L8422	CONNECTOR
56	1		8L4171	MAGNETIC PICK-UP AS.
57	1		3N935	WIRING DIAGRAM
58	1		2N9800	CONTROL AS.
59	1		5M3954	GASKET
60	1		2N232	COVER AS.
61				
62				
63	2		S1588	BOLT
64				
65				
66				
67				
68				
69				
70				

NOTE A: GOVERNOR DRIVE GEAR AND PINION MUST HAVE .002 TO .011 BACKLASH IN ASSEMBLED POSITION.

NOTE B: ASSEMBLE MAGNETIC PICK-UP INTO COVER ASSEMBLY UNTIL THE TIP CONTACTS THE END OF A RING GEAR TOOTH. THEN BACK THE PICK-UP OUT ONE-HALF TURN AND LOCK WITH THE LOCK-NUT. THIS WILL GIVE THE REQUIRED .022 TO .030 CLEARANCE WITH THE RING GEAR.

NOTE C: NOT REQUIRED WHEN USED WITH AUTOMATIC START-STOP

NOTE 7: GOVERNOR TO ENGINE SPEED RATIO = .78 TO 1.00.

2N9405

1E11	TOL
1E279	TIGHTENING

HEAT TREATMENT

MATERIAL

CHG	DATE
6	JUN 2,71
5	APR 14,71
4	FEB 15,71
3	JAN 15,71
2	SEP 18 70
1	AUG 21,70

UNLESS OTHERWISE SPECIFIED
THIRD ANGLE PROJECTION
DIMENSIONS IN INCHES
3 PLACE DIM ± .010
2 PLACE DIM ± —
ANGULAR DIM ± 1°
SCALE 1 = 1

DATE JUN 10,1970
DRN M. BARRETT
CHK C. SIMMS
APPD
ENGR DES | PROD

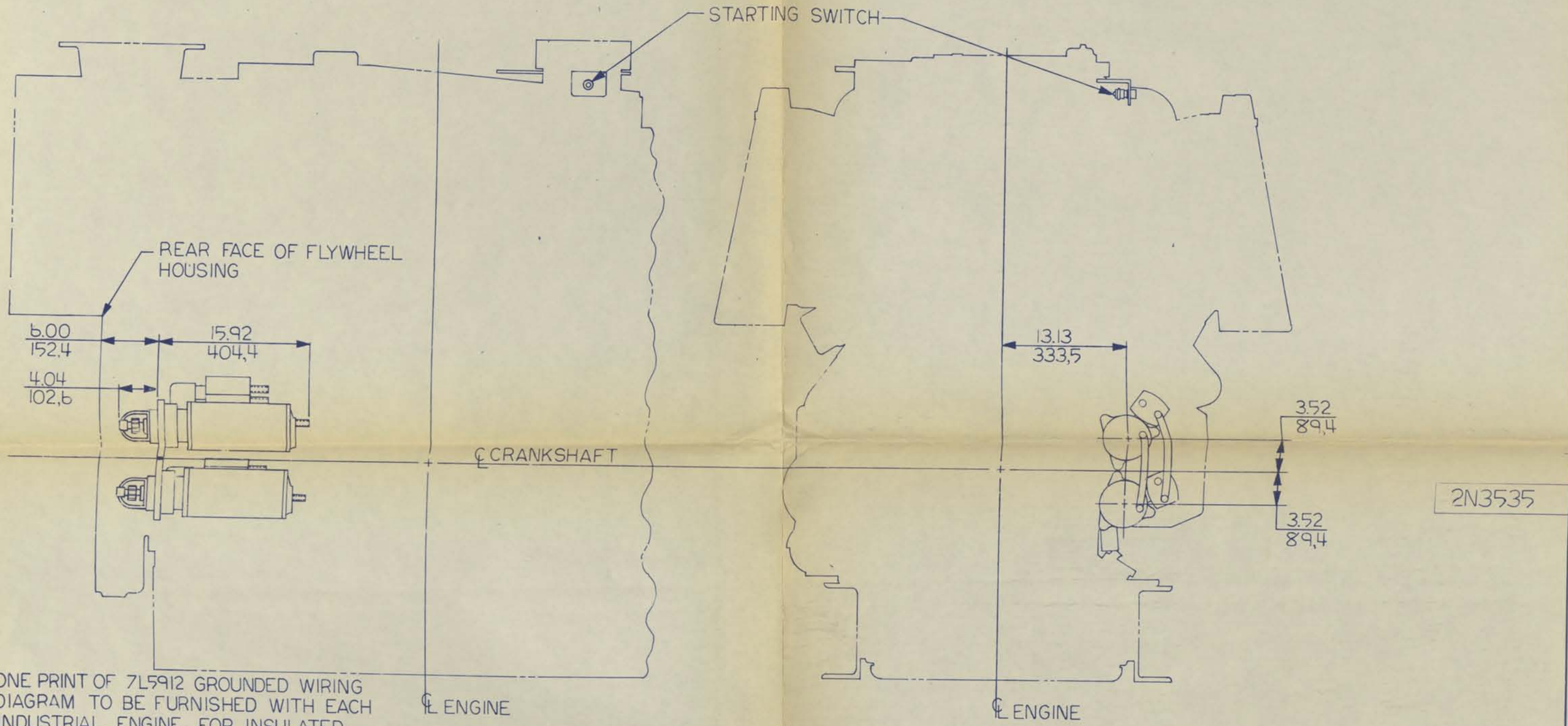
CATERPILLAR

GOVERNOR GROUP —
WOODWARD EG3P ELECTR[illegible]

2N9405 K112

2N3535

2N3535



2N3535

ONE PRINT OF 7L5912 GROUNDED WIRING DIAGRAM TO BE FURNISHED WITH EACH INDUSTRIAL ENGINE. FOR INSULATED SYSTEM USE 7L 5913. ONE PRINT OF 7L5913 INSULATED WIRING DIAGRAM TO BE FURNISHED WITH EACH MARINE ENGINE. FOR GROUNDED SYSTEM USE 7L5912. WIRING DIAGRAM NOT REQUIRED WHEN AUTOMATIC START STOP IS USED.

D348 INDUSTRIAL ENGINE WITH 7L5888 STARTING MOTOR GROUP SHOWN.

FOR PICTURE AND DIMENSIONS NOT SHOWN SEE STANDARD ENGINE DRAWINGS 7L471 AND 8L5172

FRONT VIEW

KEY- INCHES / MILLIMETERS

MODEL	GROUP REF	VOLTS
D348 (TA)	7L 5888	24
IND. AND MAR.	IN 9414	32

SYM.	DATE	CHANGES
1	NOV. 11, 69	

CATERPILLAR TRACTOR CO.

NAME INSTALL. DIMS. -STG GP- ELECTRIC

SCALE EIGHTH — DATE APRIL 2, 1969

DRAWN R.A. HAUK

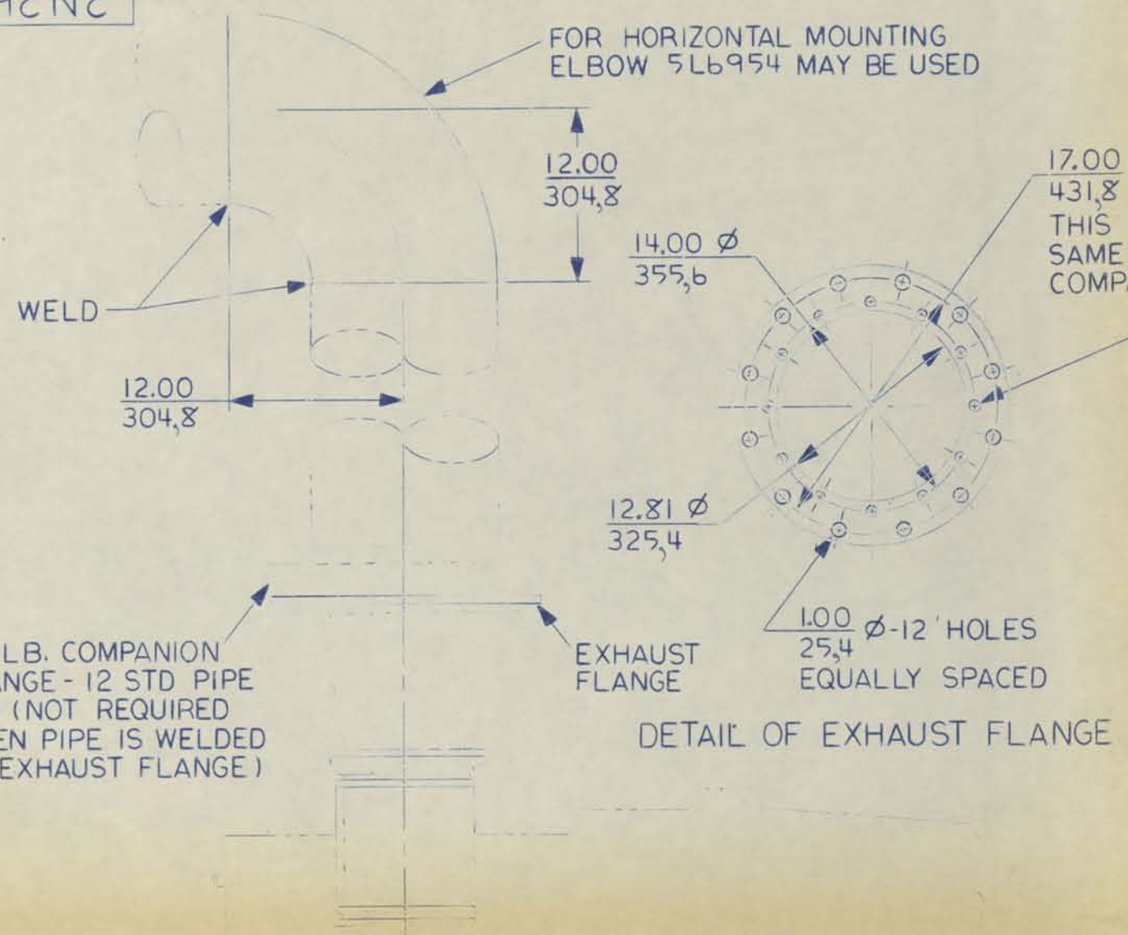
TRACED — PROVE DESG.

CHECKED W. STOVALL — PRODUCTION X

APPROV. — REDR. FROM

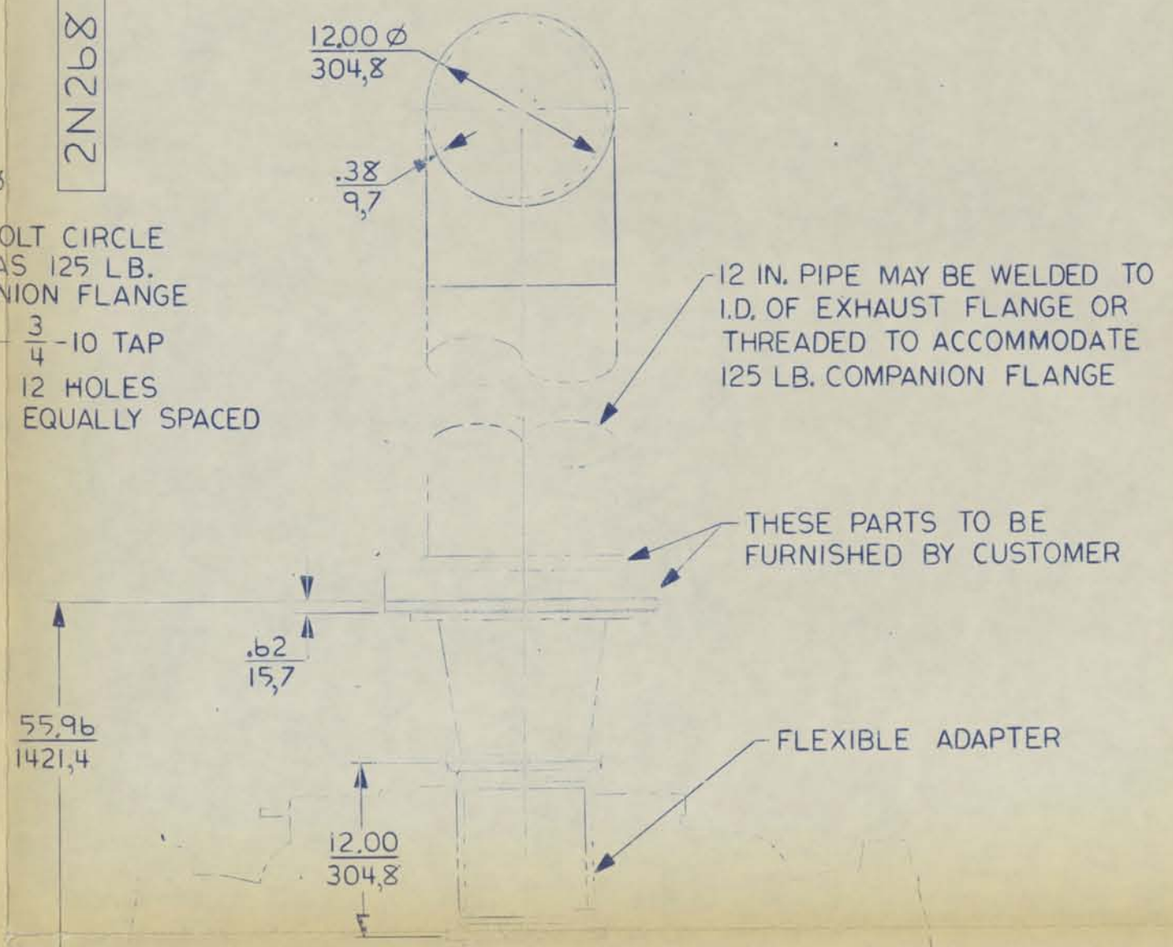
2N3535 — DESIGN CONTROL K612

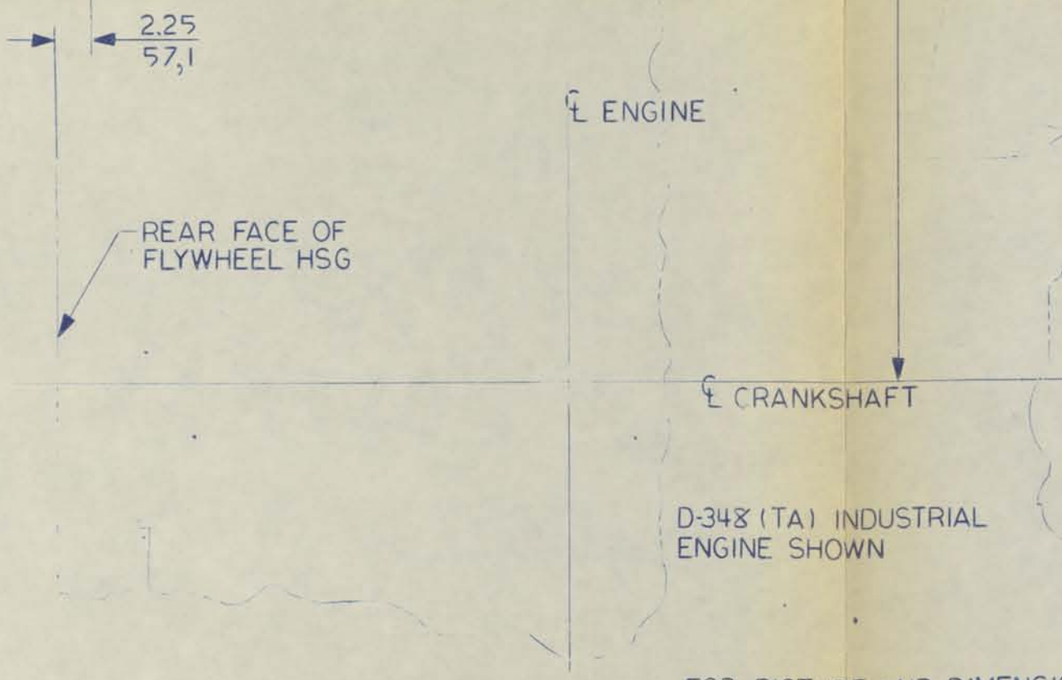
2N268



DETAIL OF EXHAUST FLANGE

2N268





D-348 (TA) INDUSTRIAL ENGINE SHOWN

FOR PICTURE AND DIMENSIONS NOT SHOWN SEE STANDARD ENGINE DRAWINGS 7L471 AND 8L5172.

FRONT VIEW

KEY - INCHES / MILLIMETERS

MODEL	VERT EXH GP	HORIZ EXH GP	EXH FLANGE GP
D-348 (TA) IND AND MARINE	5L6796	5L6954	6L3641

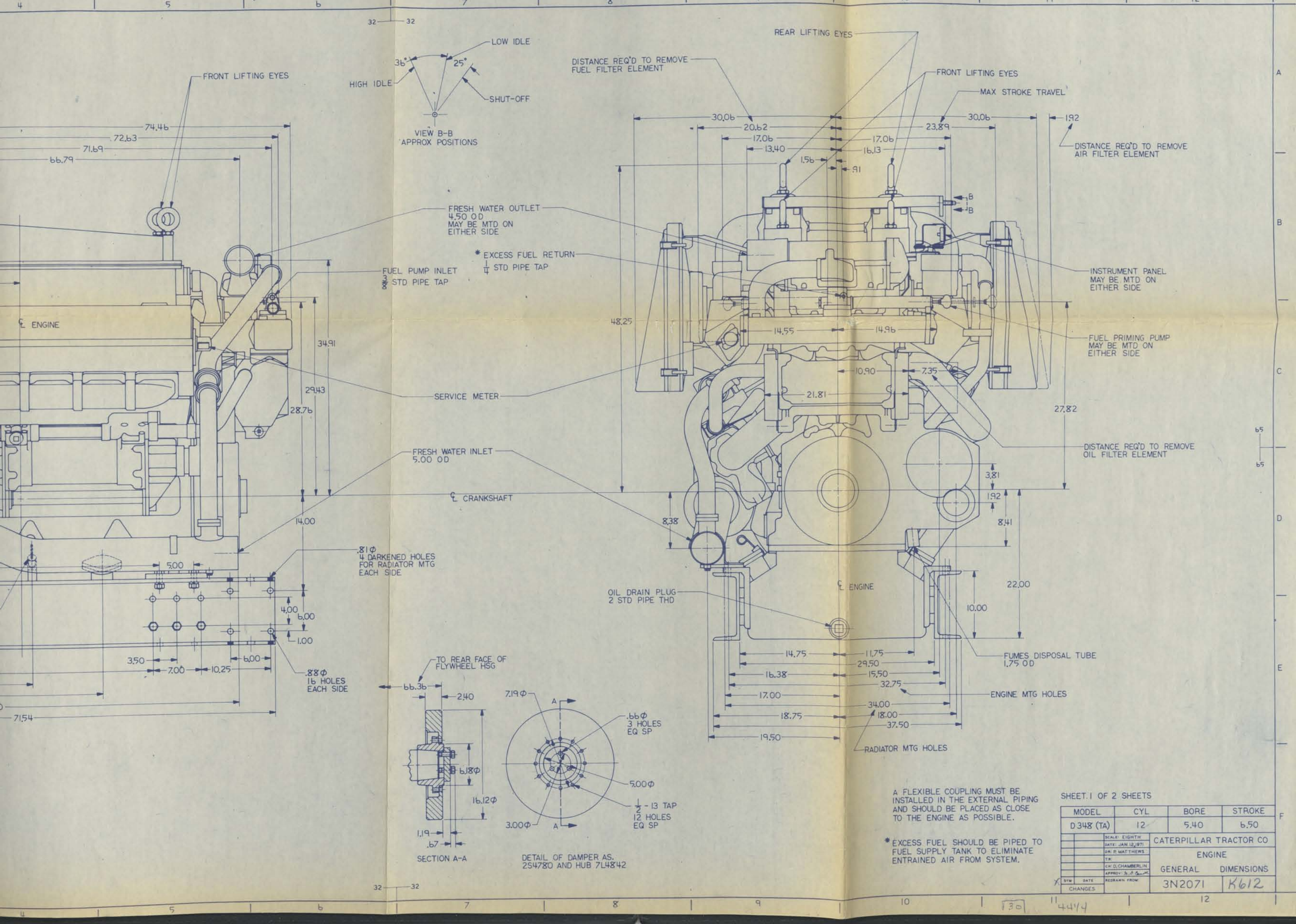
SYM	DATE	CHANGES

CATERPILLAR TRACTOR CO.

NAME INSTALLATION DIMENSIONS - EXHAUST FITTINGS (12 IN)

SCALE EIGHTH	DATE AUG. 5, 1968
DRAWN H. PAUTLER	
TRACED	PROVE DESG.
CHECKED W STOVALL	PRODUCTION X
APPROV.	REDR FROM
2N268	DESIGN CONTROL KG12

2N268



3N2071

REAR LIFTING EYES

FRONT LIFTING EYES

74.46
72.63
71.69
66.79

.82
10.02
2.23
EXHAUST (SEE DETAIL)
.50

34.80

℄ ENGINE

43.28
39.79
27.22

34.91
29.43
28.76

8.62
5.00
40.90
5.00

.81Φ
8 HOLES
EACH SIDE

OIL LEVEL GAGE

1-14 TAP
4 HOLES
EACH SIDE

REAR FACE OF
FLYWHEEL HSG

3.50
7.62
7.00
38.90
36.32
46.31
66.10
71.54

3.50
7.00
10.25
6.00

.88Φ
16 HOLES
EACH SIDE

14.00
4.00
6.00
1.00

.81Φ
4 DARKENED HOLES
FOR RADIATOR MTG
EACH SIDE

FRESH WATER OUTLET
4.50 OD
MAY BE MTD ON
EITHER SIDE

FUEL PUMP INLET
3/8 STD PIPE TAP

* EXCESS FUEL RETURN
1/4 STD PIPE TAP

SERVICE METER

FRESH WATER INLET
5.00 OD

℄ CRANKSHAFT

8.38

OIL DRAIN PLUG
2 STD PIPE THD

LOW IDLE
36°
25°
HIGH IDLE
SHUT-OFF

VIEW B-B
APPROX POSITIONS

DISTANCE REQ'D TO REMOVE
FUEL FILTER ELEMENT

30.06
20.62
17.06
13.40

48.25
14.55

14.75
16.38
17.00
18.75
19.50

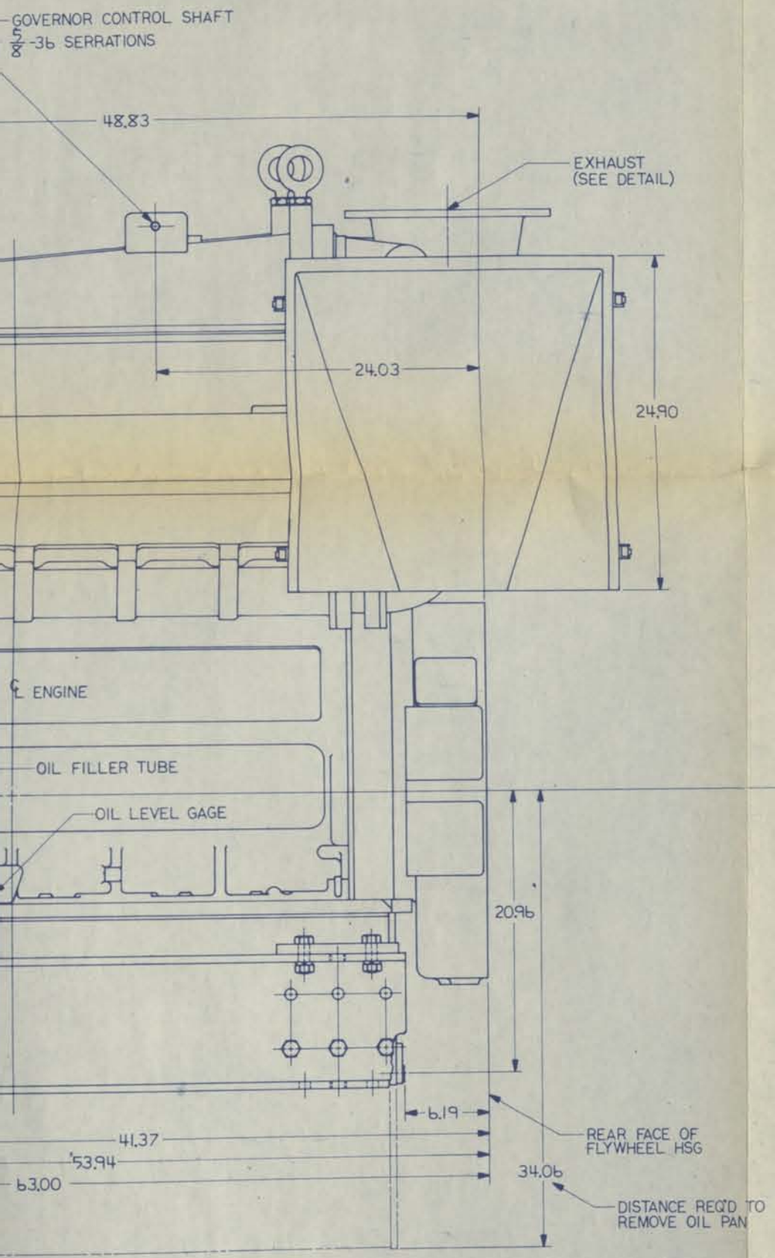
TO REAR FACE OF
FLYWHEEL HSG

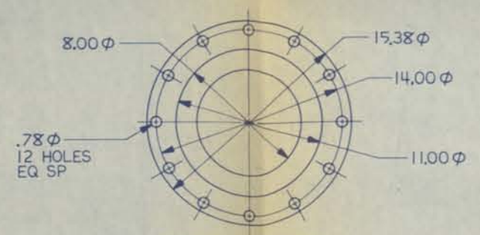
66.36
2.40
6.18Φ
16.12Φ
1.19
.67

SECTION A-A

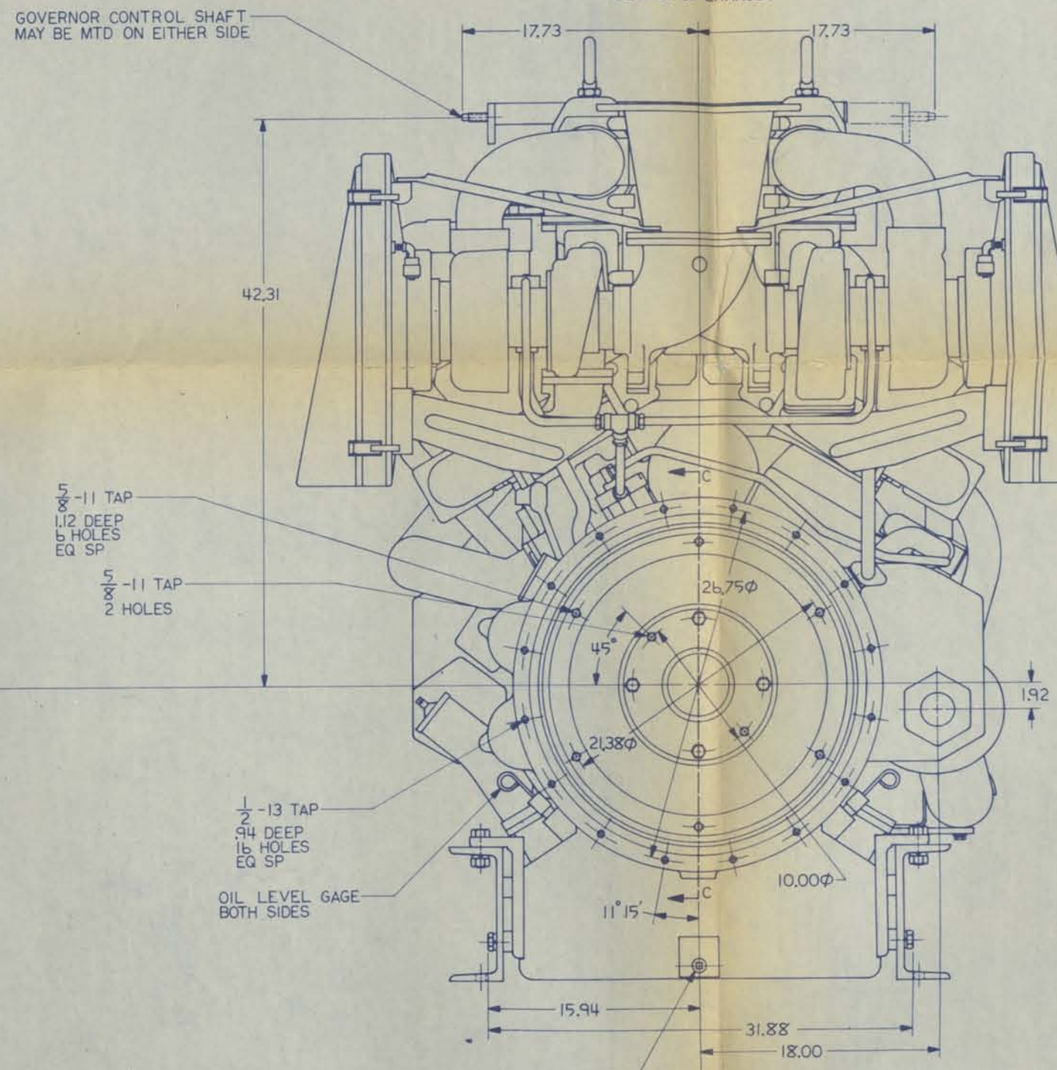
7.19Φ
.66Φ
3 HOLES
EQ SP
5.00Φ
1/2-13 TAP
12 HOLES
EQ SP
3.00Φ

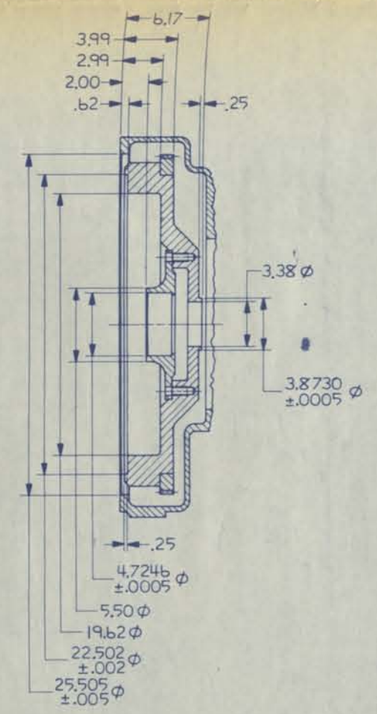
DETAIL OF DAMPER AS.
2S4780 AND HUB 7L4842





DETAIL OF EXHAUST





SECTION C-C

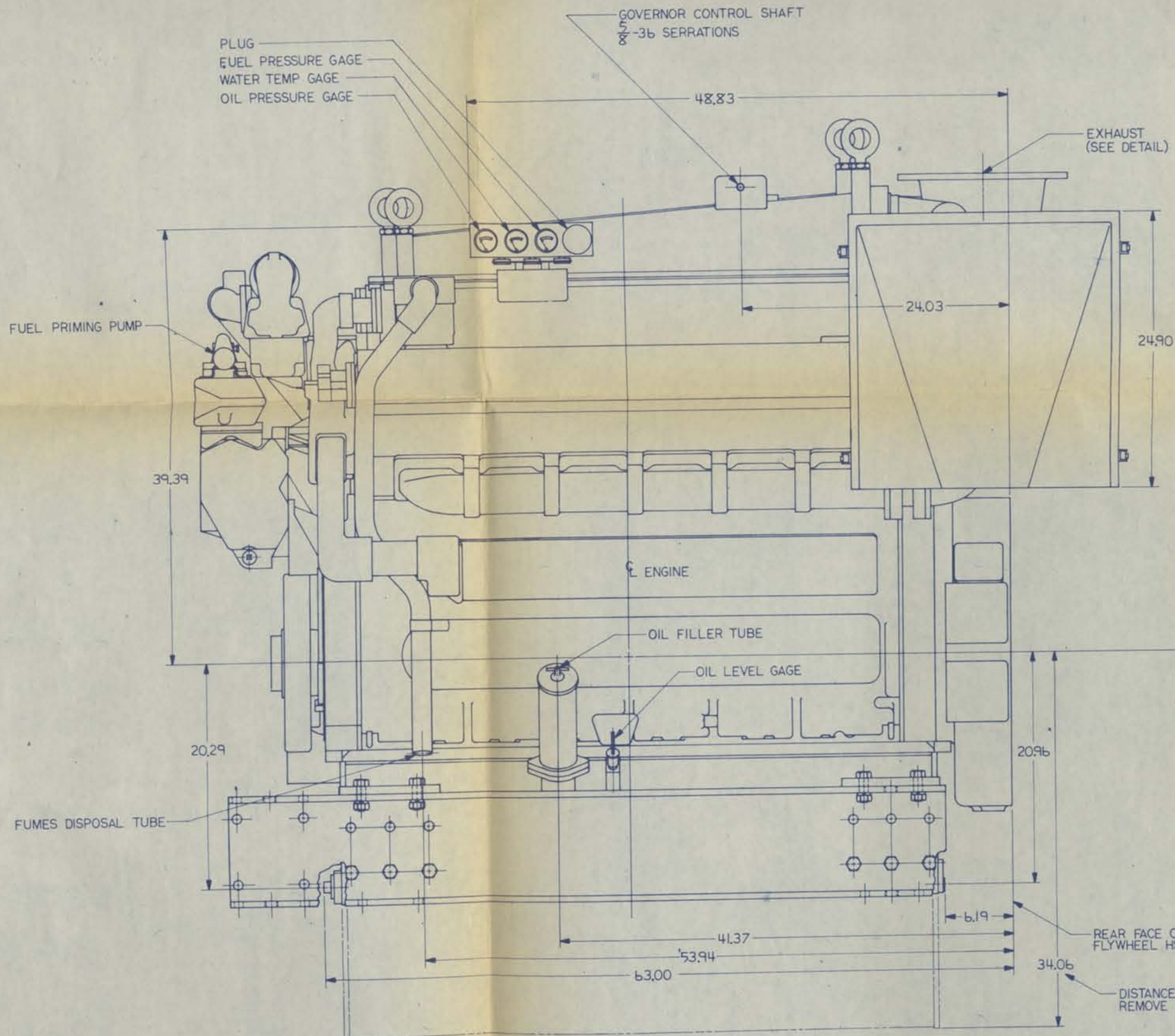
SHEET 2 OF 2 SHEETS

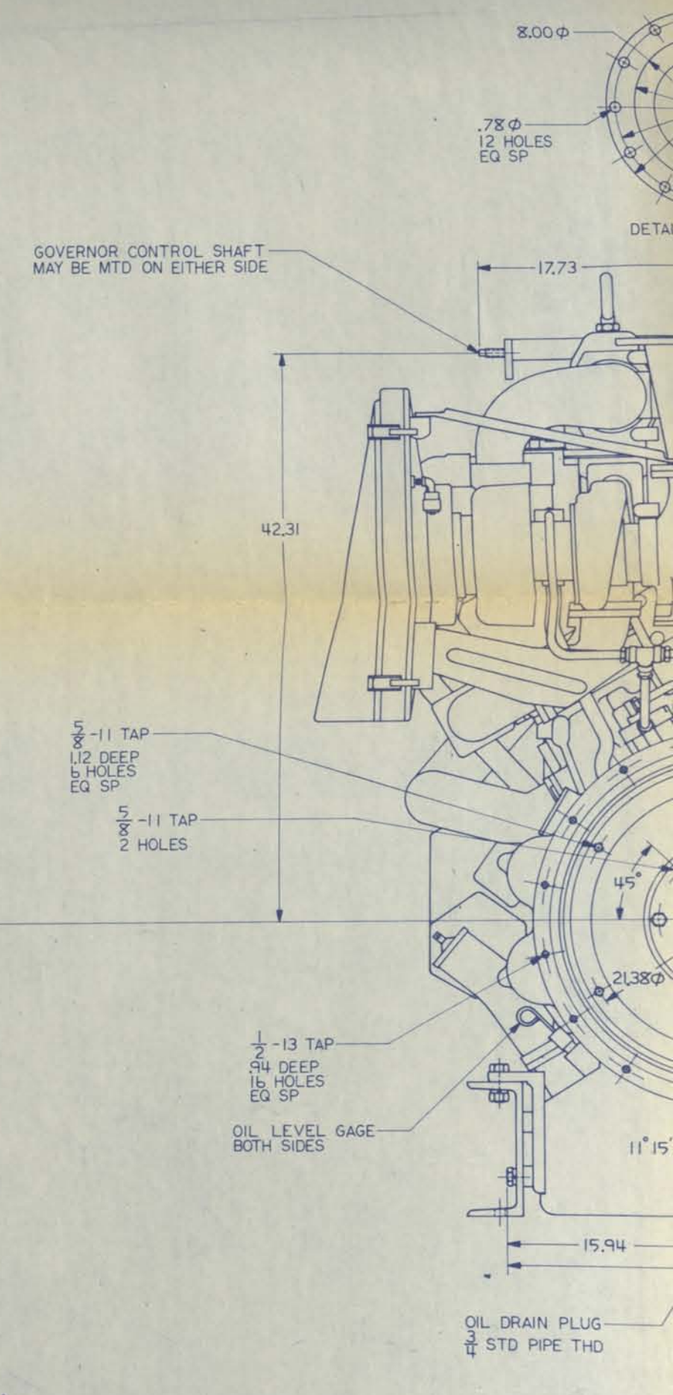
MODEL	CYL	BORE	STROKE
D 348 (TA)	12	5.40	6.50

		SCALE: EIGHTH	CATERPILLAR TRACTOR CO
		DATE: JAN 12, 1971	
		DR: R. MATTHEWS	ENGINE
		TR:	
		CH: D. CHAMBERLIN	GENERAL DIMENSIONS
		APPROV:	
SYM	DATE	REDRAWN FROM:	3N2071 K612
CHANGES			

[30] 44/41

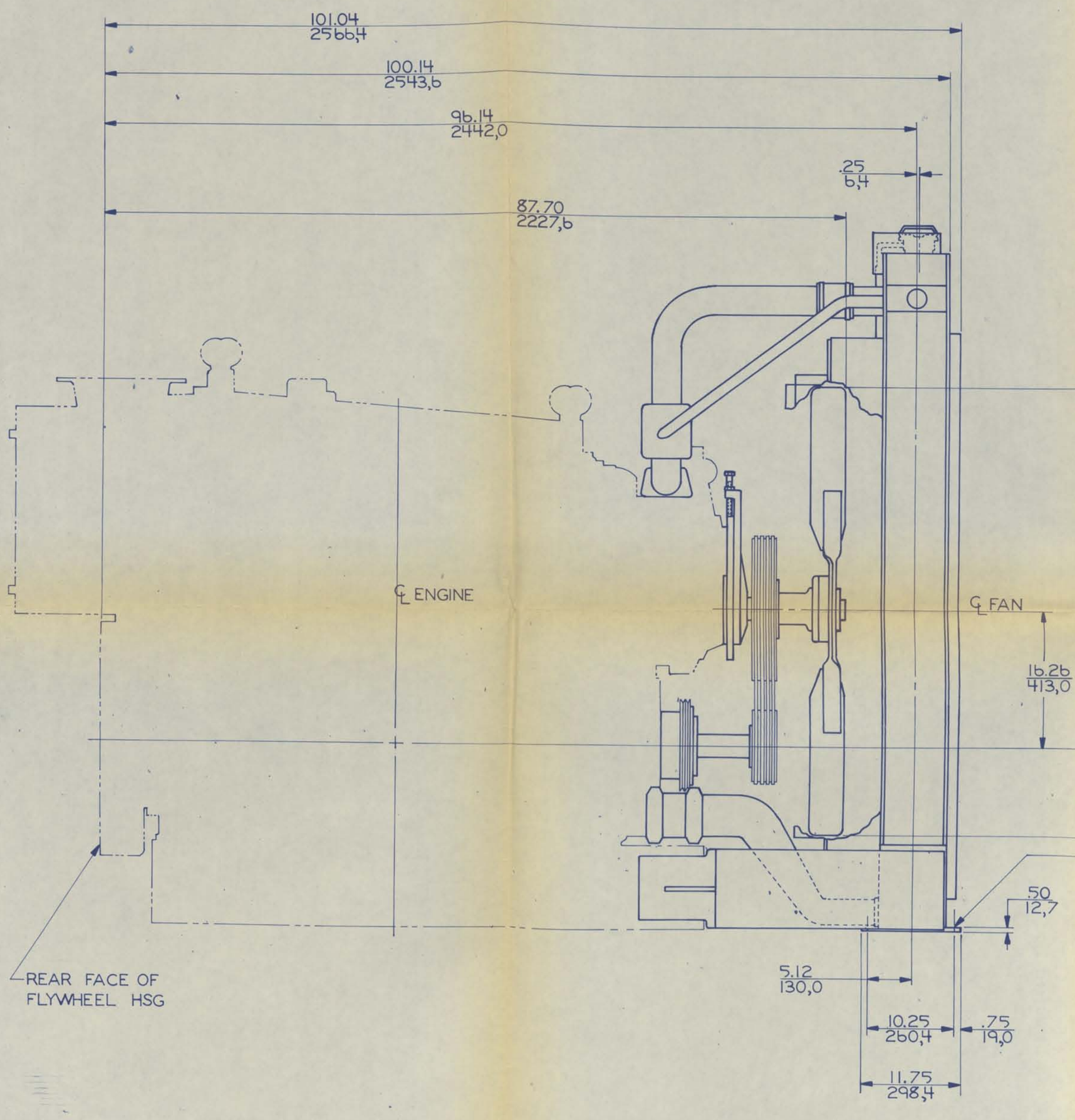
3N2071





Line Reference Target LRT-BE4-V2

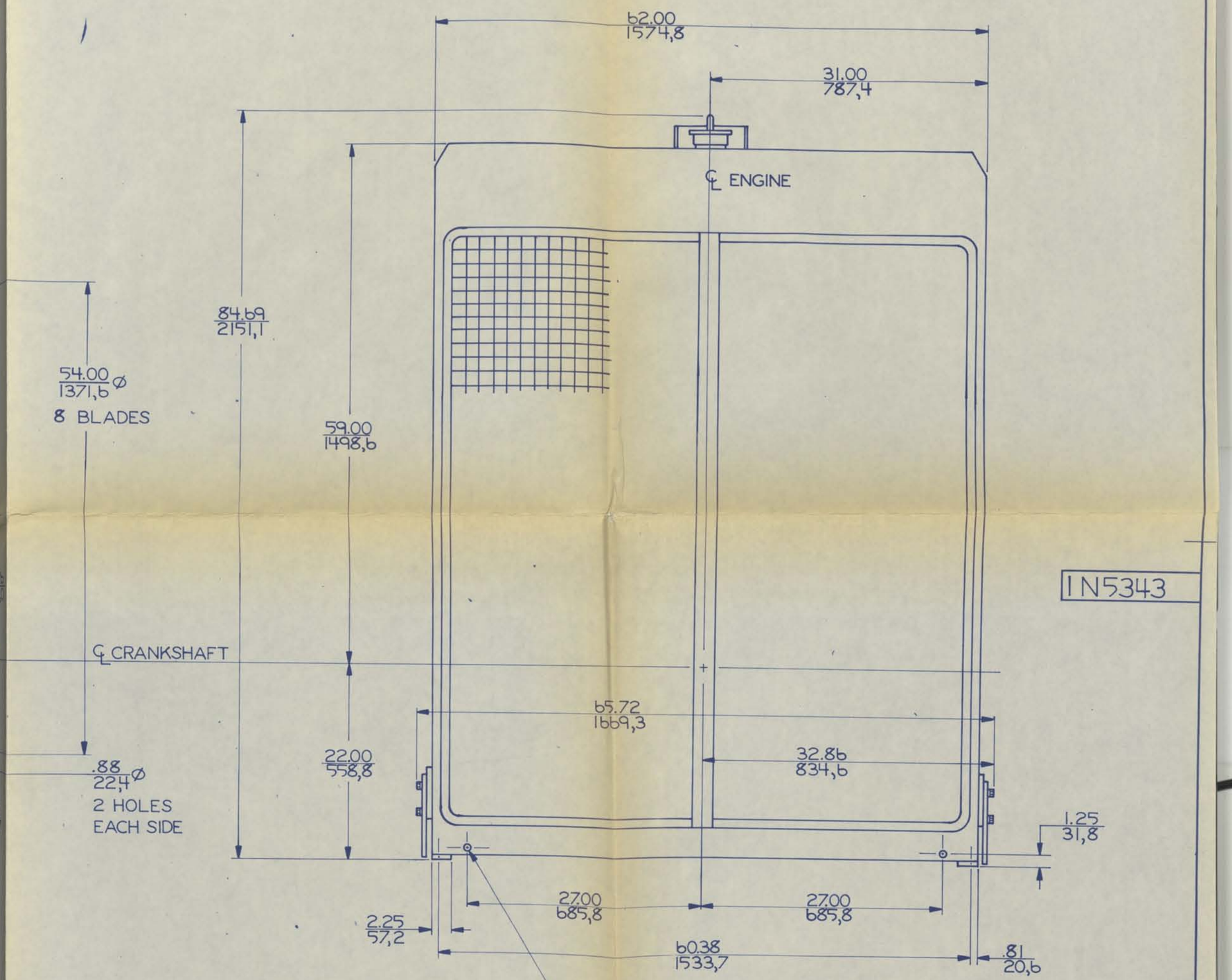
1N5343



MODEL	RADIATOR	FAN DRIVE	FAN
D348 (TA) IND ONLY	3N1131	3N648	3L6834 — BLOWER
			3L6835 — SUCTION

FOR PIC
SEE STA

IN5343



FRONT VIEW

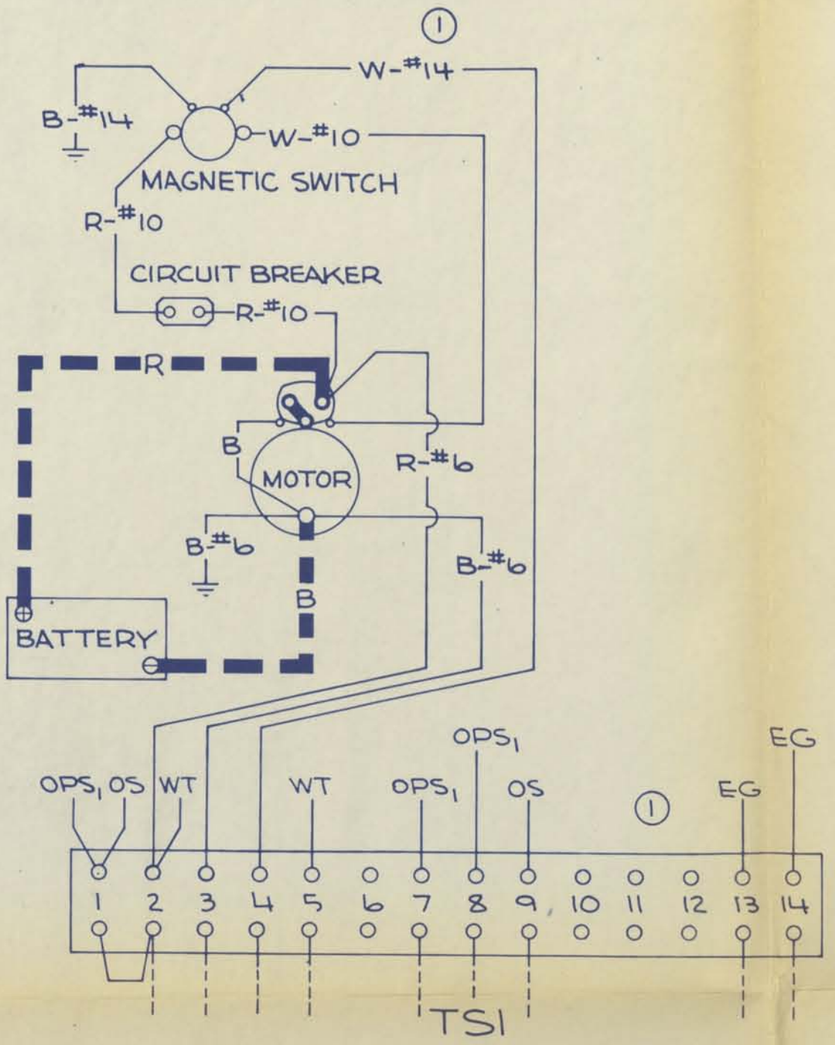
KEY — INCHES / MILLIMETERS

FOR PICTURE AND DIMENSIONS NOT SHOWN
SEE STANDARD ENGINE DRAWING 3N2071

IN5343

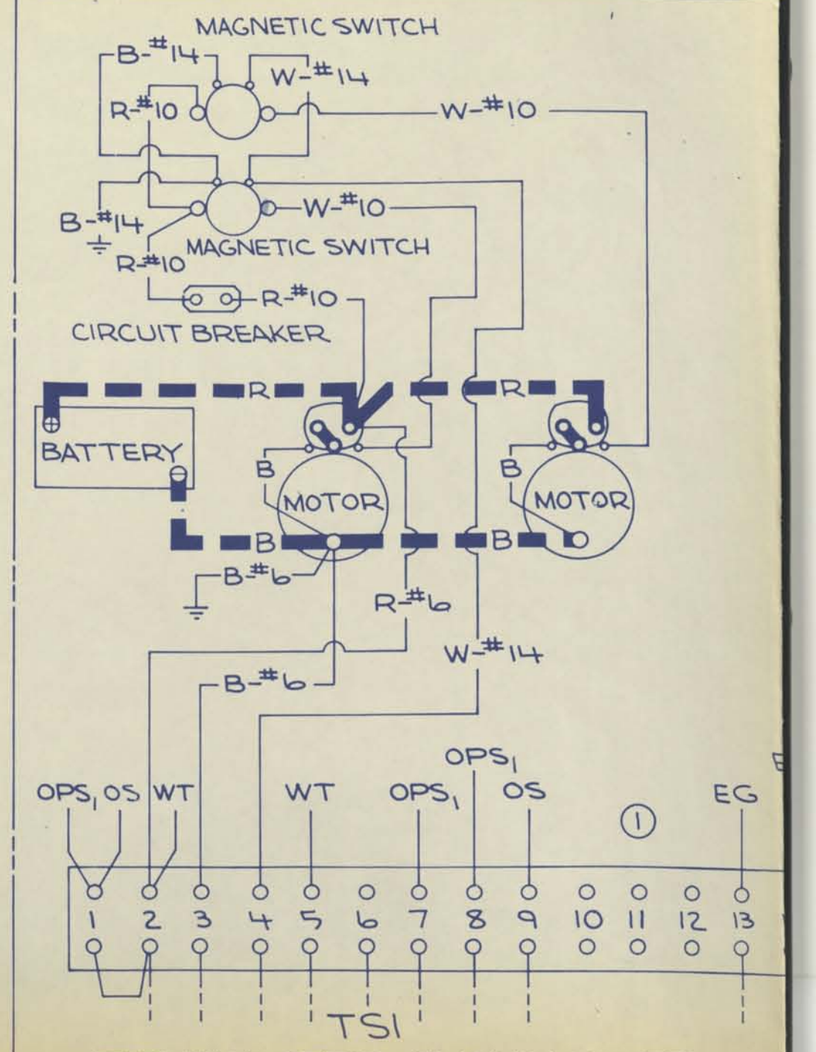
	CATERPILLAR TRACTOR CO.	
	NAME INSTALLATION DIMS. — RADIATOR AND MOUNTING GP.	
	SCALE EIGHTH	DATE OCT. 5, 71
	DRAWN D. SANDS	
X 2 OCT. 5, 71	TRACED	PROVE DESG.
SYM. DATE	CHECKED D. CHAMBERLIN	PRODUCTION IX
CHANGES	APPROV. H. D. Carroll	REDR. FROM
	IN5343	DESIGN CONTROL K612

USE APPROPRIATE STARTING SYSTEM DIAGRAM



TERMINAL STRIP – ENGINE MOUNTED
EACH WIRE ON TSI MUST HAVE A MARKER ATTACHED AT BOTH ENDS CORRESPONDING TO THE TERMINAL NUMBER ON TSI (REF: 2H2143 MARKERS)

FIG F : SINGLE STARTING MOTOR



TERMINAL STRIP – ENGINE MOUNTED
EACH WIRE ON TSI MUST HAVE A MARKER ATTACHED AT BOTH ENDS CORRESPONDING TO THE TERMINAL NUMBER ON TSI (REF: 2H2143 MARKERS)

FIG G: DUAL STARTING MOTORS

USE APPROPRIATE DIAGRAM WHEN CHARGING SYSTEM IS

FIG A : CHARGING GENERATOR

NOTE: GENERATOR TERMINALS MAY BE MARKED "A_2" IN PLACE OF "A" AND "A_1" IN PLACE OF "G". REGULATOR MAY HAVE "ARMATURE" IN PLACE OF "GEN".

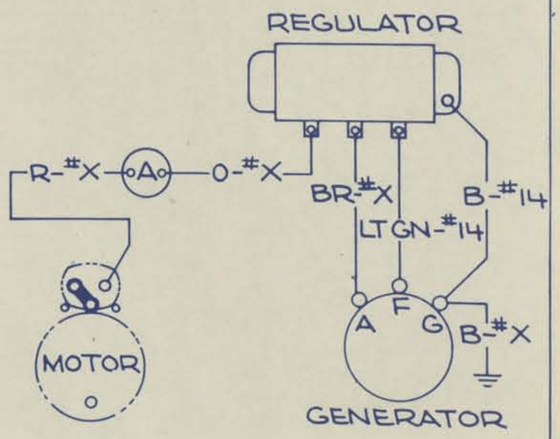


FIG B : CHARGING ALTERNATOR (6.2 DIA)

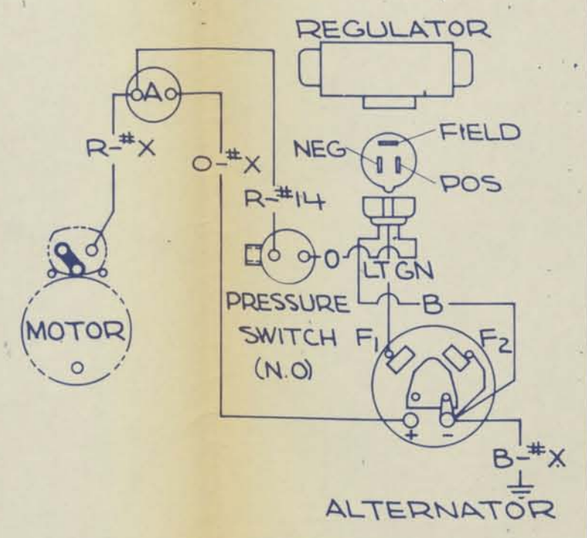
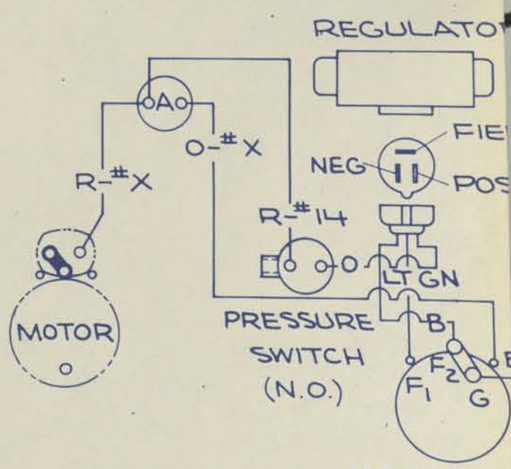


FIG C : CHARGING ALTERNAT (5.75 DIA)



CAUTION: DO NOT O
AMBIENT T
DO NOT OPE

NOTE C: MAGNETIC PICK-UP (MP) AND OIL PRESSURE CONTACTOR (OPS_2) MUST BE WIRED TO GOVERNOR CONTROL WITH TWO CONDUCTOR SHIELDED CABLE (BELDON MFG. CO. TYPE 8780 OR EQUIVALENT). (MP) SHOULD BE CONNECTED TO TERMINALS 7 AND 8 AND (OPS_2) SHOULD BE CONNECTED TO TERMINALS 9 AND 10 ON GOVERNOR CONTROL ASSEMBLY. SHIELDS SHOULD BE GROUNDED AT GOVERNOR CONTROL ASSEMBLY GROUNDING STUD. INDIVIDUAL SHIELDS SHOULD NOT HAVE MULTIPLE GROUND CONNECTIONS.

3N935

MAXIMUM RECOMMENDED TOTAL BATTERY CABLE LENGTH		
CABLE SIZE	DIRECT ELECTRIC STARTING	
	12 VOLT	24-32 VOLT
0	4.0 FEET	15.0 FEET
00	5.0 "	18.0 "
000	6.0 "	21.0 "
0000	7.5 "	27.0 "

COLOR CODE

B - BLACK O - ORANGE BL - BLUE
W - WHITE BR - BROWN PU - PURPLE
R - RED LTGN - LIGHT GREEN
W/B - WHITE WITH BLACK STRIPE

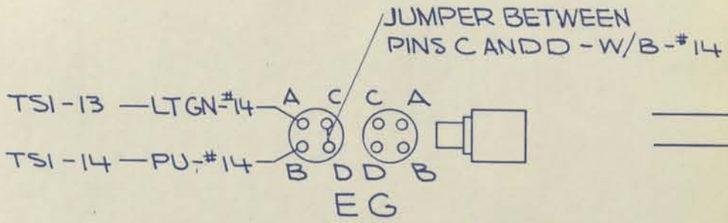
NUMBER FOLLOWING COLOR DESIGNATION INDICATES RECOMMENDED WIRE SIZE

WIRES MARKED #X	
CHARGING SYSTEM OUTPUT	WIRE SIZE
0-18 AMPS	#14
19-30 "	#10
31-45 "	#8
46-65 "	#6

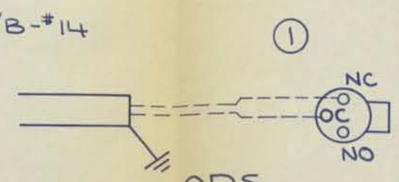
NOTE A: FOR USE WITH PANEL BUILT TO 3L89 SPECIFICATION

NOTE: WIRE AND CABLE SHOWN DOTTED TO BE FURNISHED BY CUSTOMER

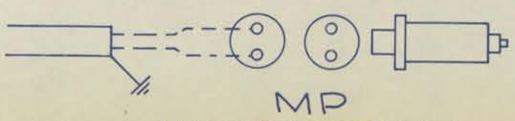
NOTE B: THIS RESISTOR REQUIRED ONLY WHEN USED WITH 30 OR 32 VOLT SYSTEMS



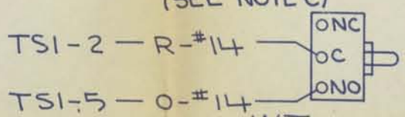
EG
GOVERNOR ACTUATOR



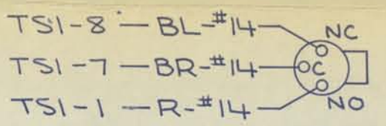
OPS_2
OIL PRESSURE CONTACTOR (SEE NOTE C)



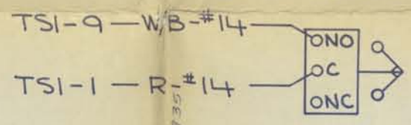
MP
MAGNETIC PICKUP (SEE NOTE C)



WT
WATER TEMPERATURE CONTACTOR



OPS_1
OIL PRESSURE CONTACTOR

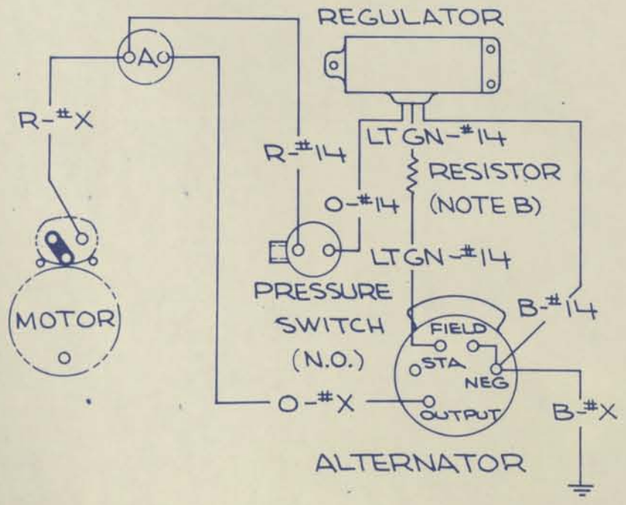


OS
OVERSPEED (IF REQUIRED)

3N935

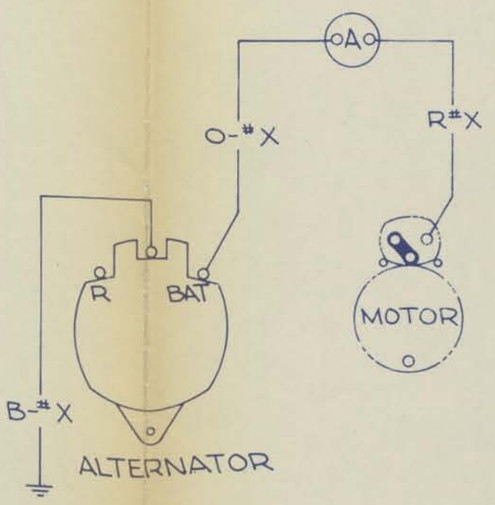
USED

FIG D: CHARGING ALTERNATOR (5.50 DIA)



ALTERNATOR

FIG E: INTEGRAL CHARGING SYSTEM



ALTERNATOR

PERATE ALTERNATOR WITHOUT A BATTERY CONNECTED IN THE SYSTEM. REGULATOR EMP NOT TO EXCEED; 170°F IN MOVING AIR, 140°F IN STILL AIR. DO NOT POLARIZE ALTERNATOR. ERATE ALTERNATOR SIMULTANEOUSLY WITH A D.C. GENERATOR TO CHARGE A COMMON BATTERY.

IE 11 TOL

HEAT TREATMENT

MATERIAL

CHG	DATE
1	JAN 3,72

UNLESS OTHERWISE SPECIFIED
THIRD ANGLE PROJECTION
DIMENSIONS IN INCHES
3 PLACE DIM. ± .010
2 PLACE DIM. ± .
ANGULAR DIM. ± 1°
SCALE =

DATE OCT 5,70
DRN S. BAKER
CHK F E Cambron
APPD. Speich
PROVE DES | PROD. X

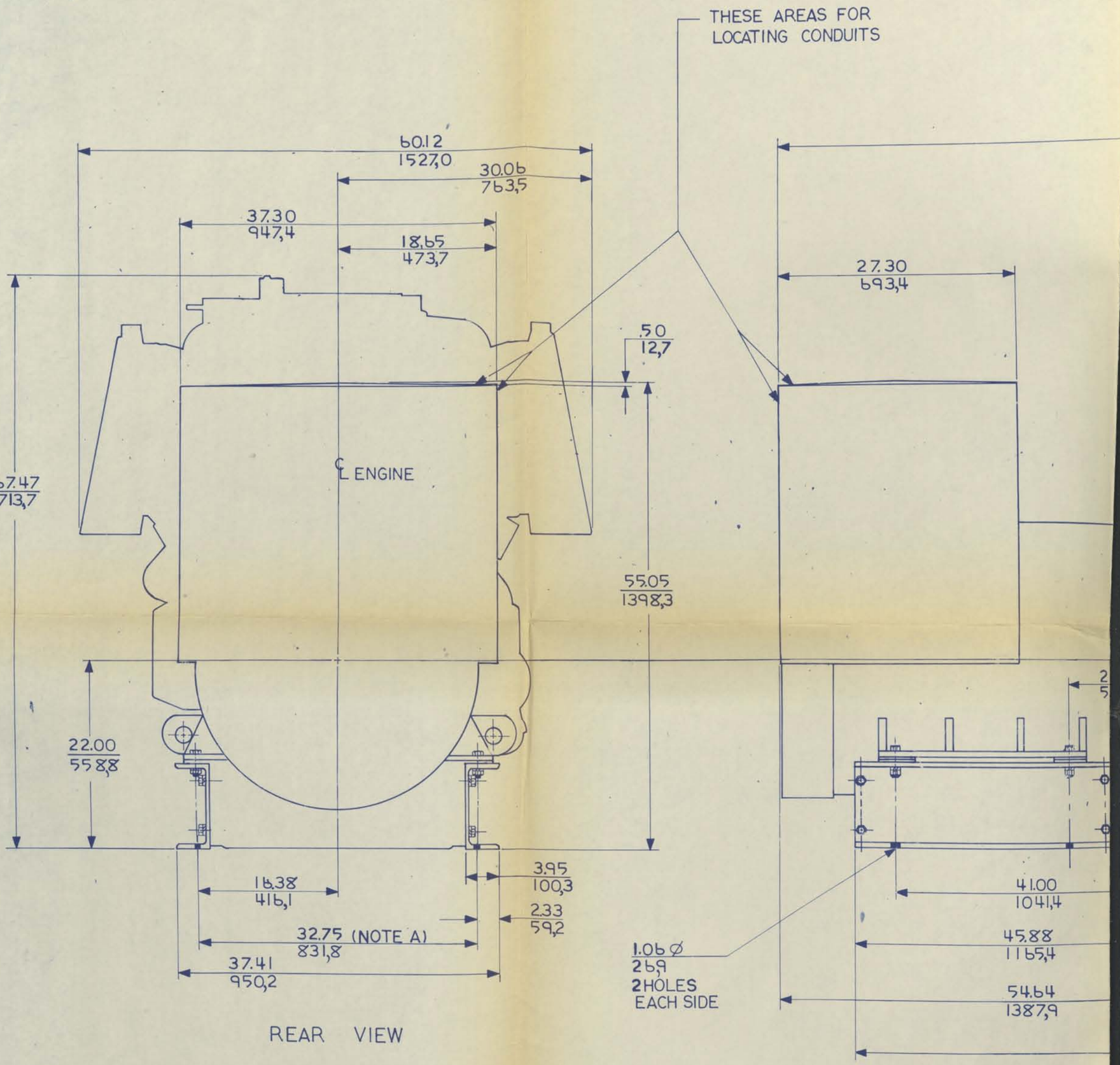
CATERPILLAR

WIRING DIAGRAM - AUTOMATIC START - STOP (NOTE A)

3N935 DES CONTROL K126

D-11-69 GP 126-7697-07

2N8102



REAR VIEW

8L41 GENERATOR SHOWN

FOR PICTURE AND DIMENSIONS NOT SHOWN
SEE STANDARD ENGINE DRAWING 7L471.

MODEL	GENERATOR	HZ	PHASE	VOLTS
D-348 (TA)	8L41 *8L80*	60	3	125/216
				230-460
		50	3	200-400
	8L42	60	3	287-575
		50	3	230-460
	8L43	60	3	2400

2N 8102

128.66
3268,0

℄ ENGINE

℄ CRANKSHAFT

1.00
33,4

2N8102

X

.81
20,6 Ø
4 HOLES
EACH SIDE

6.00
152,4

X

2.00
50,8

8.62
218,9

5.00
127,0

40.90
1038,9

5.00
127,0

6.00
152,4

5.25
133,4

.81
20,6 Ø
4 HOLES
EACH SIDE

REAR FACE OF
FLYWHEEL HOUSING

117.41
2982,2

.81
20,6 Ø
4 HOLES
EACH SIDE

KEY- INCHES / MILLIMETERS

NOTE A: DISTANCE BETWEEN HOLES MARKED X IS 3.400 / 86,36 TO PROVIDE FOR RADIATOR MOUNTING.

		CATERPILLAR TRACTOR CO.
		NAME GENERAL DIMENSIONS – ELECTRIC SET
		SCALE EIGHTH / DATE MAR 16,70
		DRAWN D. ROBERTS
		TRACED / PROVE DESG.
		CHECKED D. CHAMBERLIN / PRODUCTION 1X
SYM.	DATE	APPROV. N. O. Caudle / REDR. FROM
CHANGES		2N8102 / DESIGN CONTROL K612